

THE ECHINODERM NEWSLETTER

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The newsletter contains information concerning meetings and conferences, publications of interest to echinoderm biologists, titles of theses on echinoderms, and research interests, and addresses of echinoderm biologists. Individuals who desire to receive the newsletter should send their name, address and research interests to the editor.

The newsletter is not intended to be a part of the scientific literature and should not be cited, abstracted, or reprinted as a published document.



From Edward Forbes (184

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☆ 30TH ANNIVERSARY ☆
OF THE FOUNDING OF THE ECHINODERM NEWSLETTER

Communication among scientists is extraordinarily important. As the number of scientists working on echinoderms is not large, a journal or society to facilitate communication has never developed. Thus the founding of the Echinoderm Newsletter in 1968 by David Pawson and Maureen Downey of the Smithsonian Institution was an important contribution to progress in echinoderm biology. David noted in the first newsletter "We believe that the newsletter should be helpful in providing an informal means of communication between specialists." His belief was well founded as the issues over the years have provided not only information itself but have led to interaction and collaboration of echinoderm biologists. Let us recognize this anniversary with joy!

John Lawrence

☆☆☆☆☆☆☆☆☆☆

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☆ CURRENT RESEARCH ☆

ADAMS, NIKKI L. - effects of and defenses against ultraviolet (UV) radiation on reproduction and development of marine invertebrates; currently examining whether UV affects gametogenesis or accumulation of cellular defenses against UV radiation such as mycosporine-like amino acids and small molecule antioxidants in the gonads and gametes of the green sea urchin *Strongylocentrotus droebachiensis*; investigating how these defenses might protect embryos and larvae of echinoderms against UV radiation.

AGATSUMA, YUKI - herbivorous-algae interaction; ecological studies on population dynamics of the sea urchin *Hemicentrotus pulcherrimus*.

AHEARN, CYNTHIA - taxonomy of South African holothuroids; checklist of North American echinoderms for the American Fisheries Society with Chris Mah, Susan Hottenrott, Phil Lambert and Chuck Messing.

ALBI, YVONNE Z. - a Paleocene echinoid from the Santa Monica Mountains, Los Angeles County, California. A newly noted schizasterid.

ALI, MOHAMED SAID M. - study of some Jurassic and Cretaceous echinoids of Sinai, Egypt.

ALLEN, JOHN A. - deep-sea benthos of the Atlantic.

ALLISON, WILLIAM R. - I am a coral reef ecologist, and so am generally interested in Echinoderms. I have however, a particular interest in all facets of the life and times of *Culcita* spp. I am looking into the taxonomy and ecology of the species in Maldives, with special interest in its feeding ecology; completing research on reef survey methods and the status of Maldivian reefs.

ALVA, VICTOR - trophic ecology of benthonic suspension organisms

ANDACHT, TRACY M. - studying the mechanism of dorsoventral polarity disruption and inhibition of fertilization envelope elevation by nickel chloride in the sea urchin embryo, *Lytechinus variegatus*.

ANDERSEN, AASMUND - study of chemically induced predator responses on *Strongylocentrotus droebachiensis*.

ANDERSON, OWEN - commercial fisheries research and marine ecology; population biology of commercial species of sea urchins in New Zealand, and the collection and identification of shallow water and deep-sea echinoderms.

ANDERSON, ROLAND C. - an escape action of the asteroid *Poraniopsis inflata* in response to other sea stars.

ARAKAKI, YUJI - Taxonomy of the sea urchin, *Echinometra mathaei* and *E. oblonga*.

ARCHER, JEFFREY E. - commercial potential of Bech de Mer in New Zealand; enhancement of red rock lobster (effects of the captive environment on behaviour).

ASHA, PAYIKAT - breeding, seed-production and sea-ranching of sea cucumber *Holothuria scabra*.

AUSICH, WILLIAM I. - early radiation and phylogeny of crinoids; crinoid classification; crinoid taphonomy; Lower Mississippian crinoid macroevolution.

BALSER, ELIZABETH J. - mechanisms of asexual reproduction in echinoderm larvae.

BANGI, HELEN GRACE P. - culture and management of the sea urchin *Tripneustes gratilla*.

BARTSCH, ILSE - epi- and endozoa of ophiuroids.

BASCH, LARRY V. - environmental effects on sea urchin (*Strongylocentrotus*) reproduction and development; influences of larval abundance and condition on settlement and recruitment of sea urchins; echinoderm larval nutrition; polar echinoid growth and secondary production; kelp forest ecology.

BAUER, JOHN C. - echinoid disease studies under laboratory conditions - using the bathyal sea urchin *Palaeopneustes cristatus*. The suspected pathogen is a prokaryote. The specimens were collected by submersible from the Harbor Branch Oceanographic Institution.

BAUMILLER, TOMASZ K. - ecology and functional morphology of recent isocrinids; taphonomy of arms and stalks of articulates and advanced cladids vs. other Paleozoic taxa; diversity of Permian and Triassic crinoids and effects of the P/T extinction; patterns of turnover and extinction of Paleozoic crinoids; ecology of Seirocrinus; borings in Paleozoic pelmatozoans.

BAZHIN, ALEXANDER - monitoring the condition of sea urchin populations (*Strongylocentrotus droebachiensis*, *S. polyacanthus*) along the Kamchatka peninsula shore.

BEAVER, HAROLD H. - structure and function of blastoid summit plates.

BECKER, JOHANN - marine invertebrates of Brazilian oceanic islands, including especially echinoderms.

BEDDINGFIELD, STEVE D. - interrelationships between different species within discrete communities; environmental influences on the population dynamics and life history characteristics of organisms; ecology of flora and fauna of marine benthic ecosystems; reproductive and nutritional biology of marine invertebrates.

BEGBIE, KIRSTEN M. - studies on the hyponeural nervous system of the brittlestar, *Ophiura ophiura*.

BELL, BRUCE M. - Edrioasteroids.

BENEJAM DE, CARLA - occurrence of brooding *Amphiodia* sp. in Monterey Bay (California)

BENTLEY, ANDREW C. - biology of the sand dollar, *Echinodiscus bisperforatus* along the southeastern coast of South Africa, encompassing growth, reproduction, genetics, larval biology etc.

BERENTS, PENELOPE B. - collection manager of marine invertebrates at the Australian Museum.

BERGEN, MARY - The Southern Bight Pilot Project - a survey of soft bottom benthic communities between 10 & 200 m between Point Conception, California and the Mexican border.

BERTRAM, DOUGLAS F. - evolution and ecology of modes of development in echinoids

BIERMANN, CHRISTIANE H. - Population genetic structure in the circumantarctic sea urchin genus *Sterechinus*; Reproductive isolation and population genetics in the *Strongylocentrotidae* (Echinoidea); Camarodont phylogeny.

BILLETT, DAVID S.M. - environmental impact on the deep sea; taxonomy of the genus *Mesothuria* (Holothurioidea).

BIRENHEIDE, RUDIGER - morphology, physiology and biomechanics of crinoids.

BIRKELAND, CHARLES E. - coral reef management.

BIRYUKOVA, INGA V. - chemoreception; chemosensory systems and its morphogenesis in the marine invertebrates.

BLAKE, DANIEL B. - Cretaceous asteroids of Texas; Ordovician stelleroids; stelleroids of Seymour Island.

BLUHM, BODIL A. - age determination.

BLUHM, HARTMUT - Holothuroidea as possible indicators for physical disturbance impacts in the deep sea.

BOCKELIE, JOHAN F. - Rhombiferan cystoids, Scandinavia.

BONASORO, FRANCESCO - regeneration of crinoids.

BORZONE, CARLOS A. - Matinhos sandy beach replenishment and its impact on the benthic macrofaunal nearshore community; echinoderms of Parana's coastal waters, Brazil.

BOSCH, ISIDRO M. - UV-B effects on embryos and larvae of Antarctic echinoderms during springtime ozone depletion.

BOUDOURESQUE, CHARLES F. - effect of the invasive introduced alga *Caulerpa taxifolia* on *Paracentrotus lividus*: population dynamics and diet; long term changes of *Paracentrotus lividus* (sea urchin) populations in a protected area and a non-protected area.

BOURGOIN, ALLAIN - studying the possibility of commercializing the green sea urchin *Strongylocentrotus drobachiensis* on the northeastern coast of New Brunswick.

BREGMAN, YURIY E. - Bioproductional properties (size-age structure, longevity, growth, recruitment, elimination) of local populations of echinoderms and molluscs inhabiting far-eastern coastal waters of Russia.

BRETON, GERARD - regional fauna of fossil asteroids (Cretaceous, France); asteroid phylogeny.

BREY, THOMAS - polar echinoderm population dynamics; Antarctic ophiuroid growth; Antarctic asteroid food; Antarctic holothuroid metabolism.

BROWER, JAMES C. - taxonomy, functional morphology, paleoecology, ontogeny and phylogeny of Ordovician crinoids and blastozoans from the northern midcontinent of North America.

BUITRON-SANCHEZ, BLANCA E. - Cenozoic echinoderms (Stelleroidea and echinoidea) from Baja California, Mexico.

BURCH, BEATRICE L. - working on forams in gut of *Chaetodiadema pallidum* and in the surrounding sediments.

BURNS, CASEY - three possible new species of echinoids from the Eocene of Oregon at the Burke Museum in Seattle.

BUSSARAWIT, SOMCHAI - taxonomic study of echinoderms from the Andaman Sea, west coast of Thailand.

BYRNE, MARIA - life history evolution, echinoderm reproduction and development, ophiuroid functional morphology, echinoderm fisheries.

CALTAGIRONE, ANGELA - sea urchin aquaculture.

CAMERON, R. ANDREW - A promoter trap strategy for finding embryonic gene regulatory regions in the sea urchin genome; The spatial expression of known patterning genes in sea urchin larval development; A microsatellite analysis of homozygosity in an inbred line of sea urchins.

CAMPBELL, ALAN - sea urchin population dynamics ecology and fisheries.

CAMPBELL, ANDREW C. - zoogeography of Indian Ocean echinoderms.

CAMPBELL, DAVID B. - feeding behavior of *Asterias*.

CANDIA-CARNEVAL, M. DANIELA - crinoid arm regeneration; structure, physiology and biomechanics of complex musculo-skeletal systems (echinoid lantern, ophiuroid masticatory apparatus).

CHAO, SHYH-MIN - population dynamics of the shallow-water holothurians of Taiwan; systematics of the echinoderms from Taiwan.

CHEN, CHANG-PO - ontogenesis of skeletal plate patterns, gonad, and gonapores in the progenesive *Sinaechinocyamus mai*.

CHICCA, ANGIE - volunteer collector for Birch Aquarium at Scripps Institution of Oceanography

CLARK, ROGER N. - seastars of the Aleutian Islands, Alaska (North Pacific) of the families Pterasteridae, Solasteridae, Myxasteridae, Goniasteridae.

CLOUSE, RONALD M. - taxonomy and behavior of *Bohadschia marmorata* and *B. bivittata* (Holothuroidea) from Micronesia.

COLON-JONES, D. ELIZABETH - rearing *Diadema* larvae; rearing coral larvae; studying the sediment regime on Biscayne National Park reefs; examining calcification rates of corals.

CONAND, CHANTAL - Beche-de-Mer Bulletin 10 (No. 9 -1997); holothurian fisheries (Indian Ocean, Madagascar); asexual reproduction in sea cucumbers; population biology of the sea urchin *Colobocentrotus atratus*; biodiversity of reef echinoderms (La Reunion).

CREASER, EDWIN P. - management of green sea urchin resources of State of Maine.

CRUMP, ROBIN G. - asteroid development and ecology.

CUNHA DE JESUS, DORA MARIA - ecologic and biogeographic considerations on the Portuguese echinoderm fauna.

CUTRESS, BERTHA M. - deep sea Holothuroidea (Echinodermata) of Puerto Rico.

DAFNI, JACOB - echinoid growth.

DALBY, JR., JAMES E. - growth of arctic ophiuroids.

DAVOULT, DOMINIQUE - studies on ecology and functioning (fluxes of carbon and nitrogen at the water-sediment interface) of coastal benthic communities in the English Channel and the North Sea, with special reference to a dominant species, the ophiuroid *Ophiothrix fragilis* (Abildgaard); studies of interactions between physics (hydrodynamism) and biology (behaviour) for nutrition (suspension-feeding) and recruitment (settlement of larvae on adults).

DAYTON, PAUL K. - benthic ecology.

DE RIDDER, CHANTAL J.M. - symbioses in echinoids; food and feeding mechanisms in echinoids; taxonomy and biogeography of Antarctic echinoids.

DE WIT, WALTER M.J. - fossil echinoderms in fluvial and ice-age deposits of Holland.

DEAN, JULIETTE - Ordovician divergence of asteroids and ophiuroids.

DEARBORN, JOHN H. - functional morphology of ophiuroid tube feet; identification of Gulf of Maine and Antarctic ophiuroids and crinoids from collections on hand.

DEBENHAM, PATTY - population genetics of the red sea urchin *Strongylocentrotus franciscanus*.

DEVIN, MICHAEL G. - benthic species diversity of the Bahamian slope (depth 300 m to 900 m) - the fauna is dominated by echinoderms, particularly echinoids.

DIEHL, WALTER J. - effects of environmental stress on multilocus heterozygosity-growth relationships in invertebrates.

DOBSON, WILLIAM E. - population biology of *Ophiura sarsi* on continental slope off North Carolina; use of skeletal growth bands in ophiuroid ossicles as biological markers for sublethal predation and population ecology experiments.

DOLMATOV, IGOR Y. - mechanisms of regeneration, their formation and changes in individual development of marine invertebrates.

DOMINGUEZ, PATRICIO - working on early echinoderms, especially Cambrian and Ordovician Pelmatozoans and Carpoids from Spain.

DONOVAN, STEPHEN K. - Tertiary crinoids of Barbados and Carriacou; Miocene echinoids of Grand Cayman; the fossil record of asteroids in the Antillean region; graduate students currently documenting echinoid faunas from the Eocene (Jamaica) and Pleistocene (Jamaica and Barbados) of the Caribbean.

DRUMMOND, ANNE E. - intra and interspecific agnostic behaviour in echinoids; wave action and consequences for *E. mathaei*, *S. variolaris*, *D. savignyi*.

EBLE, GUNTHER J. - evolutionary dynamics in disasteroids, holasteroids and spatangoids; post-metamorphic spatangoid development; phylogeny of disasteroids, early holasteroids and early spatangoids.

EEKELERS, DIRK - biodiversity and distribution of asteroids on the coral reefs of Kenya.

ELISEIKINA, MARINA G. - mechanisms of regeneration, their formation and changes in individual development of marine invertebrates.

ELLERS, OLAF W. - growth of sand dollar teeth; catch collagen.

EMLET, RICHARD B. - functional morphology of echinoderm larval evolution of echinoid life histories and development.

ETNIER, SHELLEY - comatulid crinoids.

ETTENSohn, FRANK R. - Systematics, paleoecology and functional morphology of the pelagic crinoid *Saccocoma*; Paleoecology of a Late Ordovician crinoid garden community; Paleoecology of a Late Ordovician edrioasteroid firmground.

EVDOKIMOV, VLADIMIR V. - research of reproductive process of sea urchins; reproduction and development of marine invertebrates; influence of monochromatic light on the sea urchins reproductive process.

FARMANFARMALAN, A. VERDI - growth hormone and nitrogen retention.

FAY, ROBERT O. - Ovachita Belt bibliography.

FEDER, HOWARD M. - the deep benthic environment in Port Valdez, Prince William Sound, Alaska; the feeding biology of the sea star *Pycnopodia helianthoides* in Prince William Sound, Alaska; the deep benthos in Prince William sound 16 months after the Exxon Valdez oil spill; the macrofauna (infauna and epifauna--which includes large numbers of sea-star species) in the southeastern Chukchi Sea.

FERAL, JEAN-PIERRE - structure of habitat and dispersal strategies; effects of developmental modes on genetic structure and evolutionary processes (mainly in echinoids - annelids and molluscs also used).

FERGUSON, JOHN C. - madreporite functions and water volume relationships in echinoderms - currently on echinoids and holothuroids.

FERNANDEZ, CATHERINE - growth, nutrition and biochemical composition of sea urchin *Paracentrotus lividus* in rearing fed with different types of artificial food.

FLAMMANG, PATRICK - adhesive systems of echinoderm podia; ultrastructure, biochemistry of the adhesive and deadhesive substance, and adhesive force measurements.

FOLLOSCO, MINDA P. - artificial culture of economically important sea cucumber.

FORET, TIMOTHY W. - regeneration rates of *Luidia* in the field and the energetics of regenerative development; have begun thesis examining the prevalence of subcuticular bacteria in Gulf Coast (Florida) asteroids.

FOSTER, MERRILL W. - Ordovician echinoderms from western Virginia; Atlantic Ocean brachiopods; Antarctic and subAntarctic brachiopods; paleobiology of Pennsylvanian invertebrates in Illinois.

FOX, DAVID J. - analysis of articulation in the arms of *Ophiocoma echinata* and *Ophiocoma wendti*.

FRANKEL, EDGAR - coral reef lagoon sedimentation; coastal lakes, N.S.W.; volcanic ash - Mediterranean Sea; tectonics - eastern Mediterranean sea (ODP160).

FREEMAN, STEVEN M. - impact and population dynamics of seastar predation on sublittoral communities. In particular, *Astropecten irregularis* on soft-bottom communities and *Asterias rubens* on commercial mussel beds, off the coast of Anglesea, North Wales; the relationship between the sea star *Astropecten irregularis* and its commensal polyniid *Acholoe astercola*.

FUJITA, TOSHIHIKO - biology of *Coscinasterias acutispina*; ecology of Recent and fossil *Ophiura sarsii*; taxonomy of Japanese ophiuroids and asteroids.

FUKUYAMA, ALLAN K. - looking at recovery of intertidal invertebrates in Prince William Sound, Alaska following the 1989 Exxon Valdez oil spill and am particularly interested in molluscan and echinoderm assemblages and the contrast in recovery patterns between areas that were treated with hot-water, high pressure treatment with areas that were oiled and untreated.

GAGE, JOHN D. - deep-sea biology: shelf-edge benthic fluxes, and sediment community dynamics; deep-sea brittle star growth, spatial distribution and demographic modelling.

GAGNON, JEAN-MARC - bioturbation by and foraging behaviour of deepwater echinoderms: observations in mesocosms.

GALLEMI, JAUME - Cretaceous echinoids (Tethyan - worldwide); systematics, biostratigraphy and palaeoecology.

GARRISON, ROB - sea urchin aquaculture.

GEBRUK, ANDREY V. - deep-sea holothurians (order Elasipodida and, in part, Fam. Synallactidae)

GENTIL, FRANCK A. - population dynamics of ophiuroid species in soft-bottom community of the English Channel.

GEORGE, SOPHIE B. - maternal effects on larval growth and development of echinoderms; morphological and behavioral responses of echinoderm larvae to salinity gradients.

GIBSON, MICHAEL A. - continuing work on biotic interactions of Lower Devonian of West Tennessee; also studying traces of echinoids from the Coon Creek Formation (Cretaceous) and the tiering relationships present within the ichnofauna.

GIL CID, DOLORES - Cambrian and Ordovician echinoderms and trilobites from Spain; palaeological aspects, morphology and function.

GINANOVA, TALIA T. - mechanisms of muscle regeneration.

GIUDICE, GIOVANNI - regulation of heat shock protein (hsp) synthesis in sea urchin embryos; apoptosis in sea urchin development; regulation of ribosomal RNA synthesis in sea urchin development.

GLUCHOWSKI, EDWARD L. - Fammenian crinoids from the Holy Cross Mts, South Poland.

GOGGIN, LOUISE C. - biological control of the northern Pacific seastar; *Asterias amurensis* in Australian waters.

GOLDBERG, ARTHUR S. - investigating antiarthritic properties of echinoderms.

GONGADZE, GURAM - Late Cretaceous and Paleogene echinoids of the Caucasus (classification, paleobiogeography, stratigraphy).

GOODING, RICHARD U. - Animals associated with Caribbean diadematids; animals associated with diadematid echinoids, worldwide.

GRABOWSKY-KAAIA, GAIL L. - Albatross recolonization project via the Audubon Society and HI Dept. of Fish and Wildlife.

GREENSTEIN, BENJAMIN J. - taphonomy of crown-of-thorns starfish; comparative taphonomy of caribbean reefs; mode of formation of Pliocene shell beds.

GROSJEAN, PHILIPPE - biology of the European violet sea urchin *Paracentrotus lividus* under intensive land-based aquaculture.

GROVES, CATHY - *Heliaster* biogeography and systematics.

GUENSBURG, THOMAS E. - edrioasteroids, early crinoids, paleoecology of echinoderms.

GUERRAZZI, MARIA C. - natural history and the feeding behavior of the starfish *Echinaster brasiliensis*.

GUILLOU, MONIQUE - Reproduction/Recruitment: responses of sea-urchin population to environmental changes; Biodiversity: seaweed-urchin interaction.

GURREA, ISIDRE - echinoids from the Cretaceous and Cenozoic age, Mediterranean region (specifically Western Europe).

GUTT, JULIAN - polar benthos ecology.

HADEL, VALERIA FLORA - respiratory metabolism of *Chiridota rotifera* (small holothuroid found in beaches of coarse sand).

HAGEN, NILS T. - sea urchin outbreak dynamics: ecological interactions in a macroparasite/sea urchin/kelp forest system. Echiniculture/closed cycle cultivation of sea urchins: broodstock management, photoperiodic control of gametogenesis, growth, feeding, design of cultivation equipment.

HAMZA HASSAN, MOHAMED - ecology and biology of echinoderms from Gulf of Suez - Red Sea.

HAUDE, REIMUND - stratigraphy and constructional morphology of scyphocrinoids; Devonian and Carboniferous holothuroids; Lower Devonian echinoderms of Argentina.

HAVARDSSON, BJORGOLFUR - the effect of caroteins in feed and environmental temperature on the gonad color and gonad development of the sea urchin *Strongylocentrotus drobachiensis* (Mueller, 1776). The purpose of the experiment is to develop feed suitable for controlling the quality of the urchin gonad in echinoculture.

HEINZELLER, THOMAS E. - comparative, mainly neuroanatomical, morphology (TEM, histochem.) of crinoids with special attention to milleri-, bourgeti- and cyrtocrinids; entoparasitic myzostomids of crinoids, mutual effects on host and parasite on an ultrastructural basis.

HENDLER, GORDON - behavior and functional morphology of deep-sea ophiuroids; taxonomy of Okinawan ophiuroids (with S. Irimura); systematics and natural history of eastern Pacific ophiuroids.

HERDENDORF, CHARLES E. - invertebrate fauna associated with deep-sea (>2000 m) shipwrecks; invertebrate fauna of New Zealand (North Island) estuaries and tidal flats; brisingid fauna of North Atlantic Ocean; echinoid (esp. sand dollars) invasion of New Zealand estuaries following diversion of freshwater inflow.

HESS, HANS - New starfish from the Middle Jurassic (Bajocian) of northern Switzerland; Crinoid ossicles from the Lower Jurassic (Pliensbachian) of Arzo, Switzerland; Remains of Saccocomids from the Upper Jurassic of Germany (Sieverts-Doreck collection, on loan from Stuttgart Museum).

HICKMAN, JR., CLEVELAND P. - preparation of a field guide to the echinoderms of the Galapagos Islands.

HIGHSMITH, RAYMOND C. - intertidal studies in Cook Inlet, Alaska.

HILL, ROBERT B. - mechanical properties of holothurian muscle and body wall.

HOBERG, MAX K. - investigating the diet of the sea star *Pycnopodia helianthoides* from eelgrass

habitats in Prince William Sound following the Exxon Valdez oil spill.

HODGSON, ALAN N. - spermatozoan morphology of *Patiriella*.

HOFFMAN, JENNIFER - the effects of ultraviolet radiation on marine invertebrate embryos and larvae, with a focus on echinoids.

HOLTERHOFF, PETER F. - Late Paleozoic crinoid paleoecology and systematics; P-Tr extinction and eradication of the Crinoidea.

HOOPER, ROBERT G. - aquaculture of *Strongylocentrotus drobachiensis*.

HOROWITZ, ALAN STANLEY - bibliography of the fossil Blastoidea and database of blastoid taxa (with J. Waters).

HOSHI, MOTONORI - molecular mechanism of sperm-egg interactions in starfish and sea urchins; structure and function of glycosphingolipids in starfish and sea urchins; 1-methyladenine signal transduction in starfish oocytes.

HOTCHKISS, FREDERICK H.C. - echinoderm pentamerism; teratology of sea stars; Paleozoic ophiuroid morphology, evolution and classification; isolated ophiuroid vertebrae and ossicles, Devonian, Bohemia (with Petr and Prokop); new Canadian finds of Ordovician stelleroids (with D.M. Rudkin); ophiuroids from Upper Windsor Group, Mississippian, Nova Scotia (with P. von Bitter).

HOTTENROTT, SUSAN I. - systematics and cladistic analysis of *Ophiomusium* and *Ophiosphalma*; preliminary notes on a troglobitic ophiuroid from the Bahamas.

ILAN, MICHA - the study of sponge chemical (and structural) defenses against echinoderm predators; echinoderms which live in association with sponges; the impact of coral reef sea urchins on corals recruitment.

IRIMURA, SEIICHI - taxonomy of Japanese Ophiuroidea; SEM observation on disk granules of Ophiuroidea; vertebra form of Ophiuroidea.

IVY, W. GRISILDA - seed production and sea ranching of sea cucumbers.

JABLONSKI, DAVID - onshore-offshore and latitudinal patterns in the origins of higher taxa, and their subsequent shifts in environmental and latitudinal distribution; studying post-Paleozoic echinoids and stalked crinoids; studying mainly molluscan but some echinoid mass extinction and recovery patterns, especially at the Cretaceous-Tertiary boundary.

JACOBSEN, NANCY A. - identification and logging of occurrences of invertebrates, vertebrates and geologic features in the Monterey Bay; working especially with asteroidea analysis (WWW images and information will be available in the near future).

JAECKLE, WILLIAM B. - nutrient distribution among tissue in planktonic larvae of echinoderms; asexual reproduction by asteroid larvae; sites and mechanisms of nutrient assimilation by larvae.

JAGT, JOHN W.M. - Latest Cretaceous-early Palaeogene echinoderms (holothurians excepted) from

type area of the Maastrichtian Stage; late Maastrichtian echinoderm- 'lagerstatte' with bourgueticrinine crinoids and ophiolopid and ophiacanthid ophiuroids; high-diversity ophiuroid faunas of Campanian and Maastrichtian age from northeast Germany (with M. Kutscher).

JAMES, DANIEL B. - Seed production in sea cucumbers.

JAMIESON, GLEN S. - sea urchin abundance surveys; near-shore community population dynamics.

JANIES, DANIEL A. - phylogenetic analyses of the evolution of development among asteroids.

JEFFERY, CHARLOTTE H. - Maastrichtian and Palaeocene echinoids; larval strategy in recent and fossil Temnopleuroid echinoids.

JELL, PETER A. - Australian Palaeozoic echinoderms. Just completing a volume of Memoirs of the Queensland Museum which will include:- Silurian and Devonian crinoids of Victoria; Lower Devonian echinoderms (crinoids, blastoids, asterozoans) of the Bokkeveld Series in South Africa; Upper Devonian crinoids of the Canning Basin, WA; latest Ordovician to Devonian carinoids of Victoria (4 papers with Marcello Ruta); Carboniferous and Permian crinoids of Australia (2 papers with Gary Webster).

JOHNSON, SONKE - absorption spectra of echinoderm visual pigments.

JUINIO-MENEZ, ANNETTE R. - culture and population genetics of marine invertebrates (sea urchin); development of mass culture techniques for *Tripneustes gratilla*.

JUNQUEIRA, ANDREA O.R. - population dynamics of echinoids.

KAMMER, THOMAS W. - web page: <http://www.geo.wvu.edu/~kammer/welcome.htm>

KASYANOV, VLADIMIR L. - cellular mechanisms of reproductive strategies of marine invertebrates.

KAWAUCHI, GISELE YUKIMI - reproduction and dispersion - apodous holothurians.

KELLY, MAEVE S. - feasibility of commercial echinoculture in Scotland (*Psammochinus miliaris*); echinoderm/subcuticular bacteria symbioses.

KERR, ALEXANDER M. - ecology, character evolution, diversification and molecular systematics of aspidochirote holothuroids.

KEUSKAMP, DOM - recruitment of the endemic New Zealand echinoid *Evechinus chloroticus* (Echinometridae). Specifically focussing on settlement variability, natural recruitment variability, and experimental manipulation of processes operating immediately post-settlement (using cultured recruits), as well as aspects of development and the chemical ecology of settlement. Especially interested in the effects of sediment on survivorship during and after settlement, and techniques available to determine the nature of these effects. Also, the peculiarities of a marine reserve (as my major study site). Determining the relative influence these processes have on recruitment at several scales may have implications for the (small) roe fishery in New Zealand.

KLINGER, THOMAS S. - digestion in echinoids, asteroids, and holothuroids; population biology of tropical holothuroids; manufactured feeds suitable for the mariculture of echinoids.

KNOTT, K. EMILY - A comprehensive phylogeny of the Asteroidea (using molecular techniques; hopefully with representatives from every family). A study of the molecular events involved during asexual reproduction in asteroid larvae. An analysis of possible gene flow between trans-Atlantic asteroid species.

KOBAYASHI, NAOMASA - marine pollution bioassay by using sea urchins; spawning periodicity of sea urchins.

KOGO, ICHIZO - Class Crinoidea - taxonomy.

KRISHNARAJAH, PADMINI - holothuria fishery in Jaffna lagoon, northern part of Sri Lanka.

KURIHARA, TAKEO - activity rhythms of starfish; distributional patterns of starfish.

KYTE, MICHAEL A. - ophiuroid (worldwide) and asteroid (NE Pacific) taxonomy and behavior; sea cucumber ecology.

LAMBERT, PHILIP - description of two new species of *Pentamera* and a Phylloporid (Holothuroidea) from the west coast.

LANDEIRA, ANA MARIA - characterization of a Ca²⁺-atpase from sea cucumber muscle.

LANE, DAVID J.W. - The Echinodermata: a biological tool for the control and protection of marine benthic environments in Singapore waters.

LANE, N. GARY - completing three papers on Famennian (latest Devonian) crinoids from China, Britain, and Germany.

LAWRENCE, JOHN M. (University of South Florida) with Stephen Watts, James McClintock and Anne Boettger (University of Alabama at Birmingham)

El Nino mass mortalities of the starfish *Luidia clathrata* and the sea urchin *Lytechinus variegatus* in the eastern Gulf of Mexico, 1998. Heavy rains during the spring of 1998 have diluted the sea water resulting in mass mortality of *Luidia clathrata* in Tampa Bay, Florida. *L. clathrata* has been monitored in Tampa Bay since 1967. It has survived past decreases in salinity to 16-17 o/oo resulting from typical summer rains. In spring 1998 El Nino associated rains decreased the salinity to 14 o/oo salinity in shallow parts of the Bay to ca. 3 meters, resulting in elimination of the population. Although dead and dying individuals were seen, it is possible others may have migrated to deeper waters. *Luidia clathrata* continued to be found in the Bay at depths of 5 meters or more. High amounts of fresh water into the shallow bays near the Florida panhandle cities of Port St. Joe and Panama City killed large numbers of *Lytechinus variegatus*. Immigration has resulted in some re-population, but many of these individuals show evidence of spine loss and subsequent spine regeneration. This mass mortality of echinoderms resulting from decreased salinity is similar to that noted near Caracas, Venezuela several years ago.

LE MENN, JEAN - Paleozoic North-African crinoids (calyx and dissociated columnals); benthic communities, polynomorphes and medium to high frequencies cycles.

LEISMAN, JULIANNE - recruitment study of brittlestars in the Banana River; also, aspects of regeneration.

LESSER, MICHAEL P. - molecular biology of photoperiod regulation of gametogenesis in sea urchins; Identification and transmission of bacterial symbionts in *Amphipholis squamata*.

LESSIOS, HARILAOS A. - molecular phylogeny of *Diadema*; gene flow in sea urchins; population dynamics of *Diadema antillarum*; effects of sea urchins on coral recruitment.

LEVERONE, JAY R. - reproductive cycles of *Astropecten* and *Luidia* in lower Tampa Bay.

LEVIN, VALERY S. - shallow water Holothuroidea; systematics, biology feeding and fisheries.

LEVITAN, DONALD R. - ecological and evolutionary consequences of sperm limitation in echinoderms; echinoid grazing pressure in the Caribbean.

LIAO, YULIN - Fauna Sinica: Echinodermata: Ophiuroidea.

LITVINOVA, NINA M. - Revision of the genus *Ophiomyces* (Ophiacanthidae); new species and genus *Ophiuraster* (Ophiuridae); ophiuroids of New Caledonia.

LORDSON, JINBERT - seed production and sea ranching of sea cucumbers.

LOVELY, ERIC C. - coexistence of hydroid predators in *Tubularia larynx* colonies.

MACURDA, JR., D. BRADFORD - modern crinoids and blastoids.

MACZYNSKA, STEFANIA S. - Cretaceous and Tertiary echinoids particularly from Poland.

MAGSINO, RICHARD M. - population genetics of the blue-coral reef starfish *Linckia laevigata*. The techniques used in the analysis of its population structure in relation to gene flow levels among populations in the South China Sea are the protein allozyme electrophoresis and RFLP (restriction fragment length polymorphism) analysis of PCR-amplified products of its mtDNA.

MAH, CHRISTOPHER L. - I am currently finishing up a phylogeny and systematic revision of the *Brsingida*. I am concurrently describing a new genus and species of brisingid from Tasmanian seamounts. I am interested in eventually working a a phylogeny and systematic revision of the forcipulate clade, especially the zoroasterids. I have broad interests in asteroid phylogeny of deep-sea and Indo-Pacific taxa, especially Hawaii.

MAHARAVO, JEAN - study about proliferation of *Salmaciella erythracis* in Ambaro Bay (Nosy-Be) Northwest coast of Madagascar.

MAIER, MARTA S. - isolation and structural elucidation of secondary polar metabolites from echinoderms of the South Atlantic Ocean.

MAKRA, ATHENA - arm regeneration in *Acrocnida brachiata* (Ophiuroidea); microdistribution of *A. brachiata* in Little Killary, west coast of Ireland bioturbation.

- MALLEFET, JEROME C.** - luminescent ophiuroids; morphological, physiological, ecological aspects.
- MANNI, RICCARDO** - systematics, morpho-functionality, ontogenesis and evolution of Jurassic non-isocrinid crinoids.
- MANNIFIELD, KAY** - Dinantian crinoids from northwest Ireland; exploring Camerate ?extinction; crinoid palaeoecology, autecology and palaeobiology; also looking at carbonate reefal environments etc.
- MARAN, ALEKSANDRA A.** - Palaeoecological research of Lower Cretaceous Echinoidea from eastern Serbia (YU); irregular echinoids, especially genus *Heteraster*, *Toxaster*, (Spatangoids) and *Holaster*, biostratigraphy, palaeoecology, taphonomy; Cretaceous echinoids from Serbia (YU); Lower Cretaceous echinoids (Urgonian) and accompanying macro and micro fauna; Lower Cretaceous foraminifers (Orbitolinids).
- MARCOS-DIEGO, CONCEPCION** - study of benthic fauna and flora from the southern of the Livingston Island (South Shetland, Antarctica).
- MARSH, LOISETTE M.** - guide to the shallow-water echinoderms of Australia.
- MARTINEZ, PRISCILLA C.** - population and reproductive biology of the sea cucumber *Isostichopus fuscus* in the Galapagos Islands.
- MASCARENHAS, BERNARDO JOSE DE A.** - pattern of distribution of asteroidea from Guanabara Bay, Rio de Janeiro, Brazil.
- MASSIN, CLAUDE** - holothurian taxonomy, Easter Island, Indonesia, Papua New Guinea.
- MATERIA-ROWLAND, CHRISTINE J.** - developing a manual on coastal and marine monitoring; biological analysis and sediment chemistry analysis of the impact of the aquaculture industry on benthic fauna.
- MATTOS-SEGOVIA, ELIO** - the assessment of bioinducers of the settlement in larvae of sea urchin *Loxechinus albus*.
- MAUBON, ROGER M.** - preparing inventories (or catalogs) of historical collections of Echinoderms in institutions like Museum of Nancy (Paul Thiery), Museum of Chambéry (Savin, Demoly) and Museum of La Rochelle; addendum (1998) to inventories (1994) of echinoderms in Grenoble, Museum of Natural History.
- McBRIDE, SUSAN C.** - 1. Density/ration study with small (25 mm) *Strongylocentrotus franciscanus* using the extruded diet most recently developed by J.M. and A.D. Lawrence. Planned duration - 6 months. 2. Growth study of small (15 mm) *S. franciscanus* using *Nereocystis luetkeana* and the extruded diet - planned duration 1-2 years. 3. Growth study with medium (40 mm) *S. franciscanus* using the extruded diet - planned duration - 1 year. 4. Growth study of *Parastichopus californicus* using 30, 40 and 50% protein meals developed by Lawrence and Lawrence and the extruded diet.
- McCLINTOCK, JAMES B.** - chemical ecology of echinoderms from the Gulf of Mexico and Antarctica

McEDWARD, LARRY R. - simulation models of larval planktotrophy in marine invertebrates; effects of endosulfan on larval development of sea urchins.

McKENZIE, J. DOUGLAS - subcuticular bacteria in echinoderms; antifouling mechanisms of echinoderms.

McLELLAND, JERRY A. - identification and ecology of the local echinoderm fauna from the Gulf of Mexico and Caribbean areas.

McNAMARA, KENNETH J. - Neogene species of the clypeasteroid *Peronella* from Western Australia; Paleocene spatangoids from the Carnarvon Basin, Western Australia; Miocene echinoids from the Carnarvon Basin, Western Australia; Eocene echinoids from the Bremer Basin, Western Australia; fauna of Australia - spatangoids, holasteroids, clypeasteroids, cassiduloids (with Rich Mooi); general echinoid morphology, physiology and biogeography.

MEDEIROS-BERGEN, DOT E. - selective constraints on brittlestar life histories.

MELJER, LAURENT - molecular mechanisms of cell cycle regulation, using starfish oocytes and sea urchin embryos as cellular models; circadian control of the cell division cycle; identification of novel anti-mitotic compounds, with potential anti-tumor activity, using mechanism-based screening assays (purified cell cycle regulating enzymes; detection of inhibitors of cell cycle regulating enzymes in extracts prepared from marine invertebrates (collaboration with Dr. G.R. Pettit, Cancer Research Institute, Arizona State University, Tempe, Arizona).

MELIKOV, OKTAI HAMZA - investigation, evolutionary, systematic and development of orders Spatangoid, Holasteroid and Holoctypoid of Azerbaijan (late Cretaceous and Eocene).

MESSING, CHARLES G. - systematics and biogeography of comatulids; growth, morphology, distribution and taphonomy of Isocrinidae.

MEYER, CHRISTIAN A. - Tertiary asteroids from the Eggenburg area (Austria); Fossilium catalogus Austriae, Part Asterozoa.

MILLER, ROBERT J. - evolution and biogeography of the Elasipoda (Holothuroidea).

MIRONOV, ALEXANDER - Taxonomy and biogeographic history of recent holasteroid echinoids.

MITROVIC-PETROV, JOVANKA R. - study of some Cretaceous and Neogene echinoids of Serbia and Monte Negro (taxonomy, paleoecology, functional morphology, taphonomy); study of some Cretaceous and Neogene echinoids of Greece (together with A. Marcopoulou-Diacantoni - Athens).

MLADENOV, PHILIP V. - biology, ecology and population genetics of asexual echinoderms; parthenogenesis in echinoderms; population and evolutionary genetics of *Amphipholis squamata*, sea cucumber fisheries of the Cook Islands; ecology and systematics of New Zealand brittle stars.

MONTAGUE, CHRISTOPHER - regeneration capabilities of sea stars in closed systems.

MOONEY, ROBERT C. - red sea urchin (*Strongylocentrotus franciscanus*) management by the Hesquiaht First Nation: implications for community structure and the successful establishment of a

commercial sea urchin fishery.

MOORE, ABIGAIL M. - trying to set up a community-based project aiming to combine consensus-based local management of marine resources with various other initiatives to improve the economic and educational status of the villagers. This may be combined with trials of reef repair system and re-seeding of some species. Also possible involvement in one or more holothurian pen-culture projects for rearing juveniles to maturity before processing them.

MORGAN, KATHERINE - lecithotrophy in starfish; the evolution of developmental patterns and life cycle evolution.

MORRILL, JOHN B. - cytoembryology of *Echinometra lucunter*.

MOTOKAWA, TATSUO - biology of stalked crinoids; catch connective tissue.

MOUCHATY, SUZETTE - molecular systematics of the Mellitidae.

MUKAI, HIROSHI - ecosystem study in tropical and boreal seagrass beds; bioturbation and restructural effects on material flow at interface of sea floor.

NAIDENKO, TAMARA K. - cryopreservation of sea urchin embryos and larvae bioassay by using sea urchin eggs and embryos.

NAKAI, SAORI - echinoids of the family Temnopleuridae.

NAKAMURA, RAYMOND K. - involved with AQUAVAN, an educational outreach program for the Vancouver Aquarium. I travel around the province of British Columbia bringing seashore life, including sea stars, sea urchins and sea cucumbers into schools to teach children about aquatic conservation.

NAKANO, EIZO - The role of extracellular matrix in development.

NEBELSICK, JAMES H. - taphonomy of reef echinoids; Lower Miocene echinoid palaeobiogeography.

NEILL, BRUCE J. - biogeography, systematics and population biology of echinometrids.

NEPOTE, ANA CLAUDIA - holothurians of Marietas islands, Nayarit, Banderas Bay, Mexico; systematics of holothurians of Banderas Bay, Mexico (central Pacific).

NESTLER, HELMUT - Maastrichtian echinoids from the chalk of Rugen (North Germany); Cretaceous echinoids from South Yemen.

NEUMANN, CHRISTIAN - phylogeny and paleoecology of Toxasterid echinoids; echinoids and gastropod predation; Cretaceous echinoids from the Betic Cordillera (Spain); functional morphology of Cretaceous echinoids.

NICHOLS, DAVID - reproductive cyclicity in the New Zealand crinoid *Oxycomanthus plectrophorum*; seasonality in resource allocation in the English Channel starfish *Luidia ciliaris*.

NICOSIA, UMBERTO - systematics and palaeology of Jurassic crinoids; evolution and stratigraphy of

non-isocrinid crinoids.

NISHIHARA, MORITAKA - effect of heart urchins on coral community structure of the sandy bottom.

NOJIMA, SATOSHI - feeding effects of *Acanthaster planci* on recruits of corals.

O'CONNOR, BRENDAN D. - bioturbation rates of infaunal echinoderms; connection between hydrographic features and high density ophiuroid populations.

O'HARA, TIMOTHY D. - echinoderms of Macquarie Island (final stages); patterns of diversity for faunal assemblages on subtidal reefs off central Victoria (Ph.D. thesis, University of Melbourne).

OJEDA, F. PATRICIO - ontogenetic changes in the diet of *Loxechinus albus*: an ecophysiological approach. Ecology of intertidal rockpools: role of sea urchins and fishes in determining community patterns.

OJI, TATSUO - paleontology and biology of stalked crinoids; especially regeneration of crown and arms, and evolutionary history of isocrinines.

OLSZEWSKA-NEJBE, DANUTA - studying the irregular echinoids in the North European Province; stratigraphy and paleobiogeography.

OLVER, JANE - Mesozoic irregular echinoids; extant British species.

PABIAN, ROGER K. - Late Pennsylvanian-Early Permian crinoids, associated faunas, epibionts, paleoecology, and biostratigraphy.

PAGETT, RICHARD M. - Caspian Sea: literature review.

PARDO, ROBERTO A. - ecology and population dynamics of echinoderms (particularly echinoids and ophiuroids) - currently, population dynamics of sand dollars.

PARMA, SARA GRACIELA - Tertiary echinoids from Patagonia and La Pampa Province, Argentina.

PAULS, SHEILA MARQUES - distribution of the echinoids in coral communities.

PEARCE, CHRISTOPHER M. - marine invertebrate settlement, metamorphosis, recruitment.

PENCHASZADEH, PABLO E. - Ecology of sand dollars (*Mellita* spp.); trophic ecology of asteroids.

PENNINGTON, J. TIMOTHY - primary production in the central California upwelling zone; brachiopod larvae of the Monterey Bay Submarine Canyon.

PEREZ-RUZAF, ANGEL - wetlands and coastal lagoons of Galapagos Islands (Ecuador) - basis for its protection and management; Iberic fauna; study of benthic fauna and flora from the southern of Livingston Island (South Shetland, Antarctica); design of new algorithms for the primary productivity and water quality prediction in coastal zones using remote sensing techniques.

PETR, VACLAV - preparation of a photographic, comprehensive book, "Atlas of Echinoderms of the

Barrandian area". This book will be written in English and published at the end of 1998.

PHILIPPE, MICHEL - Miocene echinoids.

PIEPENBURG, DIETER - ecology of brittle stars in Arctic and Antarctic seas.

PODOLSKY, ROBERT D. - biochemistry of temperature adaptation in gametes of *Strongylocentrotus* spp.; evolution of egg accessory structures in free-spawning invertebrates.

PORTELL, ROGER W. - echinoid biostratigraphy of Florida (especially undescribed Miocene taxa); occurrence of phosphatic echinoids, brachiopods, and annelids from the Upper West Florida slope, eastern Gulf of Mexico.

PRESTEDGE, GEOFFREY K. - study of Pittwater, S.E. Tasmania, re: the regrowth of *Zostera* sp., also *Codium* sp. beds now that nutrient levels in the water have decreased with upgrading of local sewerage treatment plants, and to see if several species of echinoderms return if the above species of algae recover sufficiently.

PUTCHAKARN, SUMAITT - taxonomic study of echinoderms from the eastern coast, the Gulf of Thailand.

RAJAKUMAR, C. P. - biology and ecology of certain Indian echinoderms; investigating the bioactive substances of Indian echinoderms.

RAM MOHAN, M. K. - reproductive biology (including reproductive cycles), induced maturation and cross fertilization of echinoderms, especially holothurians.

REGIS, MARIE-BERTHE - population dynamics of regular echinoids in the Mediterranean; enzymatic study of the nutrition of *Paracentrotus lividus* (Echinodermata: Echinoidea).

REICH, MIKE - fossil holothurians, especially holothurian sclerites of the European boreal Upper Cretaceous; holothurian remains of Oligocene clays (Rupelian) of northern Germany; Jurassic and Cretaceous calcareous ring elements with comparisons to recent holothurians.

REY, DANIEL - Cretaceous and Tertiary echinoids of Spain.

ROBINSON, SHAWN M.C. - green sea urchin fishery ecology; roe enhancement of the green sea urchin; development of artificial diets for sea urchins.

ROCCATAGLIATA, ALEJANDRO J. - chemistry of physiologically active compounds isolated from starfishes and brittle stars in the South Atlantic Ocean.

RODRIGUEZ, SEBASTIAN R. - subtidal brown macroalgae forests as food sources for intertidal organisms: role in determining community patterns in the rocky intertidal environment.

ROGERS-BENNETT, LAURA - examining the impact of larval feeding history on the growth and success of newly settled red sea urchins; examining the survival of newly settled urchins exposed to micro-predators in the benthos; spatial patterns in the growth and survival of juvenile red abalone.

ROSE, EDWARD P.F. - Jurassic irregular echinoids; Cenozoic holoctypoid echinoid *Echinoneus*.

ROTMAN CLARK, HELEN E.S. - systematics of Southern Ocean asteroids and ophiuroids.

ROUX, MICHEL - Taxonomy, ontogeny, ecology of recent and fossil Articulata (Crinoidea).

ROWE, FRANK - Indo-west Pacific echinoderms and their systematics and zoogeography; Indian Ocean echinoderms with A.C. Campbell.

ROY, MICHAEL S. - molecular evolution of ophiuroids: phylogeny, phylogeography, population genetics in *Amphipholis squamata*, *Ophiactis savignyi*, *Ophiocoma scolopendrina*.
(<http://www.dnapop.zi.ku.dk>)

SABA, MASAKI - taxonomic studies of Japanese sea-stars.

SAMYN, YVES - distribution and biodiversity of holothuroids along the Kenyan coast; feeding biology of commercial holothuroids from Kenya; reproductive biology of commercial holothuroids from Kenya; distribution and biodiversity of regular echinoids along the Kenyan coast.

SANFORD, ERIC - foraging behavior, recruitment, and growth of *Pisaster ochraceus*.

SANO, MINORU - population ecology of *Strongylocentrotus nudus*.

SASTRY, DWADASI R.K. - echinoderms of coral reefs.

SCALLY, KEVIN - tooth form function and evolution of invertebrate dental systems, especially tooth sharpening behaviour (thegosis).

SCHELTEMA, RUDOLF S. - larval dispersal - most recently in the Antarctic.

SCHOPPE, SABINE - The Echinoderms of Leyte, Philippines - a practical field guide.

SCHUETZ, ALLEN W. - development of a new model for multiparameter analyses of perturbations of gametic and embryonic processes.

SEETO, JOHNSON - taxonomy of Fiji echinoderms.

SERAFY, D. KEITH - zoogeography of Atlantic echinoids.

SEWELL, MARY - life-history and early development in echinoderms; temperature effects on larval development; holothurian reproduction and ecology; larval physiology.

SHEPHERD, SCORESBY A. - food web studies; comparison between abalone and sea urchins.

SHICK, J. MALCOLM - effects of UV on echinoid eggs and embryos; dietary accumulation of mycosporine-like amino acids by echinoids.

SHIRLEY, THOMAS C. - predator-prey and competitive interactions between sea otters, crabs and starfish in Glacier Bay, Alaska.

SIBUET, MYRIAM - deep sea ecology and deep sea echinoderms; cold deep environments; deep sea basins.

SKOLD, MATTHIAS - The role of environmental factors in regulating sexual and asexual reproduction in sea stars. Genetics of sexual and asexual populations of the sea star *Coscinasterias muricata* around New Zealand. Population dynamics, growth, regeneration, feeding and predator-prey interactions in brittle stars. Structuring mechanisms in marine benthic populations; interactions between burrowing heart urchins (*Brissopsis lyrifera*) and brittle stars (*Amphiura chiajei*). Ecotoxicology and fate of contaminants in marine environments, especially infaunal brittle stars.

SLOAN, NORMAN A. - sea cucumber fisheries.

SMILEY, SCOTT - annotated catalogue of holothurians with synonymies; annual cycle of *Parastichopus californicus*, changing conditions of body wall muscles.

SMIRNOV, ALEXEI V. - deep-water holothurians from New Caledonia; Arctic and North Pacific echinoderms fauna; taxonomy of apodid holothurians.

SMIRNOV, IGOR S. - taxonomic studies of arctic and antarctic ophiuroids, creation of illustrated computer key for arctic brittle-stars and data bases on ophiuroids of Arctic and Southern Oceans.

SMITH, ANDREW B. - morphological and molecular phylogenies of echinoderms; Maastrichtian and Palaeocene echinoids.

SOLIS-MARIN, FRANCISCO A. - evolution of echinoids; taxonomy of the phylum.

SOLOVJEV, ANDREY N. - Holasteroid and spatangoid echinoids (evolution, classification, paleoecology); echinoids on the Cretaceous/Paleogene boundary.

SONNENHOLZNER, JORGE I. - systematic evaluation of the reef echinoderms at the Machalilla National Park, Manabi, Ecuador; ecology of the sand dollar *Mellita longifissa* Michelin intertidally at the Machalilla National Park, Manabi, Ecuador.

SPENCER, LARRY T. - symbiotic relationship between *Holothuria atra* and the polka-dot crab in the Hawaiian sublittoral zone.

SPONER, RENATE - molecular evolution of ophiuroids: phylogeny, phylogeography, population genetics in *Amphipholis squamata*, *Ophiactis savignyi*, *Ophiocoma scolopendrina*. (<http://www.dnapop.zi.ku.dk>)

STANCYK, STEPHEN E. - population biology, predation and regeneration of *Ophiura sarsi*; sublethal predation of echinoderms; use of markers and growth rings of ophiuroid ossicles for age/growth studies

STEWART, BRIAN G. - reproductive biology of *Astrobrachion constrictum* and *Ophiopsammus maculata* (Echinodermata: Ophiuroidea); growth rate and reproduction in *Stichopus mollis* (Echinodermata: Holothuroidea).

STICKLE JR., WILLIAM B. - investigating seasonal and latitudinal adaptations of *Leptasterias* spp. populations to temperature from the physiological perspective.

- STORC, RICHARD - ophiuroids and asteroids from the Upper Cretaceous (Cenomanian-Turonian) of the Bohemian Cretaceous Basin (Czech Republic).
- STRATHMANN, RICHARD R. - developmental plasticity of larvae; limits on the aggregation of embryos; evolution of rates of development of embryos.
- STUMP, RICHARD J. - population dynamics of *Acanthaster planci* (L.).
- SUMIDA, PAULO Y.G. - ecology and ontogeny of the post-larval development in deep-sea ophiuroids
- TABLADO, ALEJANDRO - systematics of Asteroidea from southwestern Atlantic and Antarctic Peninsula.
- TAHERA, QASEEM - an illustrated key to the echinoderms of Pakistan.
- TAKAHASHI, KEIICHI - physiology of the madreporite; physiology of echinoid spine muscle and catch apparatus; motile mechanism of echinoderm sperm flagella.
- TALBOT, TIFFANY D. - salinity tolerances and other factors of *Ophiophragmus filograneus*.
- TAVARES, YARA A. G. - ecology, histology, morphology studies of *Mellita quinquiesperforata* in beaches of Parana's State, relation between morphodynamics and spatial distribution.
- TELFORD, MALCOLM - collagen in tooth support mechanism of clypeasteroids; podial forces in *Asterias*; computer simulation of *Dendraster* distribution.
- THANDAR, AHMED S. - Monograph of the southern African holothuroid fauna. Study of the dee sea holothuroids collected off the southern African east and west coasts.
- THIERRY, JACQUES - Jurassic (Mesozoic) echinoids - France and some western Europe countries; morphology and relation with palaeoenvironment changes (overall sea-level variation).
- THORNDYKE, MICHAEL C. - molecular and cellular aspects of neuronal development; environmental influences on development; neuronal regeneration; neuropeptides, biochemistry and physiology.
- THORSEN, MARIANNE S. - the ecophysiology of the irregular sea urchin *Echinocardium cordatum* - interactions with gut microbiota.
- TIEFENTHALER, LIESL - research on the red brittlestar *Amphiodia urtica*.
- TOMINAGA, HIDEYUKI - biology of the sand dollar and heart urchin, especially key-hole urchins: *Echinodiscus tenuissimus* and *Astrichypeus manni* in Japan, and brooding spatangoids like *Abatus*, encompassing population study, growth, development, age determination.
- TRONCOSO, JUAN F. - identifying collections of Antarctic echinoderms in the Natural History Museum of Concepcion, Chile; studying several species of echinoderms from the Pacific coast Eight Region; the conservation problems of the echinoderms of Chile and their future projection.

TUTERA, PETER - monograph of the irregular echinoids of Prydz Bay, Antarctica; new *Pachycentrotus* species.

UBAGHS, GEORGES J.C. - new echinoderms from the Upper Cambrian of the Montagne Noire (southern France).

v.JUTERZENKA, KAREN - ecology of Arctic ophiuroids and their function within the benthic food web (within the framework of AOSGE).

VADAS, ROBERT L. - ecology and reproductive biology of sea urchins along the coast of Maine. Funded by NOAA Sea Grant (1995-1997); temporal and spatial variability in reproduction and roe yield in green sea urchins. Tentatively funded by Maine Dept. Mar. Res. (1996-1997).

VADET, ALAIN - Triassic echinoids of St. Cassian; evolution of Triassic and Jurassic echinoids.

VALENTINE, JOHN - continuing investigations of sea urchin herbivory and predation on sea urchins in the Florida Keys.

VAN DER HAM, RAYMOND W.J.M. - *Hemiaster* and *Echinogalerus* of the Upper Cretaceous of NW Europe.

VAN HOUT, TESSA - distribution of *Echinothrix diadema* in Kenyan reefs.

VANDENSPIEGEL, DIDIER - the defensive mechanism of the Echinodermata: structure and functions of the Cuvierian tubules.

VEGA, JUAN TORRES - study of the echinoids and ophiuroids collected on the Campanas Oceanograficas Proibe I-II-III-IV-V.

VELARDE, RONALD G. - benthic infauna and trawl invertebrates of the Southern California Bight, taxonomy and distributional ecology (in conjunction with other monitoring agencies in southern California).

VIKTOROVSKAYA, GALINA I.- reproduction of invertebrates in artificial and natural conditions.

VILLIER, LOIC - Cretaceous and Jurassic asteroids of the Aquitaine Basin (France) dealing with taxonomy (based on isolated ossicles in a Tethyan region, weakly known), skeletal ontogeny, evolutionary trends (ontogenetic and ecological constraints, biogeographic exchanges) and relations between biodiversity and paleoenvironmental changes.

VISTISEN, BODIL K. - studying the two brittle stars *Ophiura albida* and *Amphiura filiformis* concerning their tolerance towards hypoxi with and without the presence of hydrogenesulphide.

WAREN, ANDERS H. - gastropods parasitic on echinoderms.

WASSON, KRISTINA - reproduction and factors that control reproduction in echinoids.

WATTS, STEPHEN A. - steroid metabolism in echinoids.

WEBSTER, GARY D. - Carboniferous and Permian crinoids of Australia - with Peter Jell; Early Carboniferous crinoid faunas of the western U.S.

WELSCH, ULRICH - innervation of the juxtaligamental cells in crinoids; analysis of the connective tissue of crinoids.

WHITE, CHRIS - crinoids.

WIDDISON, ROSANNE - Ph.D. dissertation (started 10/97) entitled, Palaeobiology of Silurian crinoids. Involves a complete taxonomic review of UK Silurian collections and establishment of crinoid communities in UK. Also looks at the variations in US and UK faunas.

WILKIE, IAIN C. - functional morphology and mechanics of the echinoid lantern; functional morphology and mechanics of the ophiuroid mouth-frame; organisation, mechanics and physiology of echinoderm connective tissues; autotomy mechanisms of echinoderms and other invertebrates.

WILLCOX, MARK S. - molecular phylogeny of asteroids; genetic basis to salinity adaptation in asteroids.

WILLIAMSON, JANE E. - An autogenic shift in the response of the echinoid, *Holopneustes purpurascens*, to host plant chemistry (current Ph.D. at the University of New South Wales). Intense grazing by the sea urchin *Heliocidaris erythrogramma* on algal community structure (group project).

WORHEIDE, GERT - actuopaleontology and ecology of *Astrosclera willeyana* Lister 1900 (Demospongiae) (for Ph.D. thesis); taphonomy of coral reef echinoids.

WRAY, GREGORY A. - evolution of body-patterning genes in echinoderms; evolution of echinoderm larvae; phylogeny of echinoids.

YAMAGUCHI, MASASHI - supervising a thesis on *Acanthaster planci*.

YANAGISAWA, TOMIO - larval development from plutei to metamorphosis of the sea urchins in the Ogasawara (Bonin) Islands.

YOKOTA, YUKIO - extracellular matrix and morphogenesis in the sea urchin; phylogenetic analysis of yolk proteins in sea urchins and starfishes; functions of vitellogenin and vitellogen in the sea urchin and starfish.

YOSHIZATO, KATSUTOSHI - molecular evolution of invertebrate collagen.

YUND, PHIL - fertilization processes, gamete toxicology, and the genetic differentiation of populations of *Strongylocentrotus drobachiensis*.

ZAVODNIK, DUSAN V. - biodiversity of the Adriatic Sea invertebrates - Echinoderm distributional patterns.

ZITT, JIRI - Lower Cretaceous crinoids of West Carpathians; crinoids and echinoids of the Bohemian Cretaceous Basin (late Cenomanian- early Turonian).

☆ THESES AND DISSERTATIONS ☆

AUSTRALIA

Ph.D. Dissertation

Jane Williamson. (in progress). An autogenic shift in the response of the echinoid, *Holopneustes purpurascens*, to host plant chemistry. University of New South Wales, Australia.

BELGIUM

Masters Thesis

Dirk Eekelers. (in progress). Distribution and biodiversity of asteroids in Kenya's coral reefs. Vrije Universiteit Brussel, Belgium.

Tessa van Hout. 1996. Distribution of *Echinothrix diadema* on the Kenyan Coast. Vrije Universiteit Brussel, Belgium.

Yves Samyn. 1995. Reproduction of two non-commercial sea urchins (Echinodermata: Echinoidea) in the Mombasa Marine National Park, Kenya. Vrije Universiteit, Brussel.

CZECH REPUBLIC

Ph.D. Dissertation

Richard Storc. (in progress). Ophiuroidea from the Upper Cretaceous of the Bohemian Cretaceous Basin (Czech Republic). Charles University, Praha.

ECUADOR

Ph.D. Dissertation

Sonnenholzner, J. (in progress). Desarrollo y optimización de pruebas inmunitarias en *Echinometra vanbrunti* (Echinodermata: Echinoidea) para la identificación de biomarcadores de estrés ambiental. Universidad de Guayaquil.

FRANCE

Thèse Doctorat Ecologie

Fernandez, C. 1996. Croissance et nutrition de *Paracentrotus lividus* dans le cadre d'un projet aquacole avec alimentation artificielle., Univ. Corse, Fr., 279pp.

GERMANY

Ph. D. Dissertation

Reich, M. 1997. Die Holothurienreste (Echinodermata) der Schreibkreide (Unter-Maastrichtium), Insel Rügen/Ostsee. [Holothurian remains (Echinodermata) from the White Chalk (Lower Maastrichtian), Isle of Rügen/Baltic Sea]. - Unpublished Diploma-Thesis, University of Greifswald, vol. I: 96 pp., 17 figs., 5 tables., vol. II: 8 encl.; Greifswald.

Masters Thesis

Bluhm, B. (1997). On the ecology of regular sea urchins in the northern Barents Sea [in German]. Kiel University.

INDIA

Masters Thesis

M.K. Ram Mohan. 1993. Studies on the salinity tolerance of the venerid clam, *Paphia malabrica* (Chemnitz). Cochin University of Science and Technology, India.

JAPAN

Ph.D. Dissertation

Shimizu, M. 1992. Studies on the ultrastructure and growth of skeletons of the test and spines in the sea urchin, *Strongylocentrotus intermedius*. Hokkaido University, Japan.

Master of Science

Yuji Arakaki. 1989. A comparative ecological and reproductive study on the four types of sea urchin *Echinometra mathaei* (Blainville) on Okinawa reef flat. Dept. of Biology, University of the Ryukyus.

NEW ZEALAND

PhD Dissertation

M. Lamare. 1997. Recruitment ecology of the sea urchin *Evechinus chloroticus* in the New Zealand coastal habitat. University of Otago.

Masters Thesis

Jeff Archer. 1996. The reproductive and larval biology and ecology of the temperate holothurian *Stichopus mollis* (Hutton). Leigh Marine Laboratory.

Jane Williamson. Distribution patterns and life-history features of the intertidal encrusting alga *Pseudolithoderma* sp. University of Auckland, New Zealand.

NORWAY

Masters Thesis

Haldis Ringvold. 1996. Artsbestemmelse og utbredelse av sjoestjerner (Echinodermata: Asteroidea) rundt Faeroeyene (Identification and distribution of starfishes (Echinodermata: Asteroidea) around the Faroe Islands). Norwegian University of Science and Technology (NTNU), Trondheim Biological Station, Norway.

PAKISTAN

Ph.D. Dissertation

Qaseem Tahera. (in progress). Systematics, reproduction and larval distribution of holothuroids and echinoids inhabiting the Arabian Sea. University of Karachi, Karachi, Pakistan.

PORTUGAL

Degree - Marine Biology and Fisheries

Dora Maria Cunha de Jesus. 1998. Ecologic and biogeographic considerations on the Portugese echinoderm fauna. University of Algarve.

UNITED KINGDOM

Masters Thesis

Moore, Abigail Mary - (submitted 1998) - A study of the holothurian resources and some other invertebrate fisheries combined with work aiming to interpret a 1993 Landsat TM satellite image for the new Wakatobi National Marine Park in SE Sulawesi, Indonesia. The University of Hull, UK. (The MSc course title is Global Biodiversity, Monitoring and Conservation at The University of Hull, UK).

UNITED STATES

Masters Thesis

Michel Lynn Gielazyn. 1997. Subsurface feeding behavior of the burrowing ophiuroid *Microphiopholis gracillima* (Stimpson) (Echinodermata). University of South Carolina.

Robert Miller. (in progress). Rapid ingestion of sinking organic matter by bathyal surface deposit-feeders, as indicated by Th-234. University of Massachusetts, Boston.

Ph. D. Dissertation

Tracy M. Andacht. 1998. Functional studies in early development of the sea urchin: I. Elevation of the fertilization envelope. II. Commitment of the dorsal-ventral axis. Duke University, North Carolina.

Christiane H. Biermann. 1997. Reproductive isolation and the molecular evolution of sperm bindin in stronglylocotritid sea urchins. Dept Ecology and Evolution, SUNY at Stony Brook, NY.

☆ INFORMATION REQUESTS ☆

Bauer, John - please inform me of any echinoid diseases or mortalities. I can be contacted at the following address: 7794 Cloverfield Circle, Boca Raton, Florida 33433, USA.

Dora Jesus - would appreciate literature on the genus *Schizaster* (Echinoidea) living, Mediterranean Sea and Atlantic Ocean, especially taxonomic.

K. Emily Knott - I am hoping to collect sea stars in the Cape Verde Islands and possibly the Canary Islands at some time during the next year. If you have had some experiences collecting in these areas, please send me email at kekknott@life.bio.sunysb.edu I would love to talk to you.

Also, I am still collecting any EtOH preserved or frozen sea star tissue for molecular work to help my efforts in producing a comprehensive asteroid phylogeny. If you wish to make a donation to my cause, contact me at kekknott@life.bio.sunysb.edu. Thanks!

Richard Magsino - I am working on the population genetics starfish, *Linckia laevigata*. I would like to contact researchers working on the population genetics of starfishes or any other echinoderms using protein allozyme electrophoresis and other DNA-level genetic markers (e.g. mtDNA RFLPs). My samples came from the South China Sea region in the Southeast Asia. Please contact rickym@msi01.cs.upd.edu.ph

Chris Mah - I am always interested in obtaining asteroid material from deep-sea Central Pacific and Indian Oceans. Especially brisingidans, forcipulates and goniasterids. Please contact cmah@cas.calacademy.org

Abigail Moore - I would like to have contact with anyone with experience in - attempting regulation (by consensus, enforcement or a mixture) of holothurian exploitation, especially "on the ground", working with fishing communities, not just designing regulations.

- artisanal pen-culture of juveniles, especially working with communities with low economic and educational status.
- improving returns to fishing communities (post-harvest mainly)
- education programmes for coastal communities
- collection of local environmental knowledge

I would also like to contact anyone with similar types of experience or interest based on any tropical coastal species, not just holothurians. I am very keen to pursue options for reconciling the conservation of biodiversity with the needs of coastal human populations. My immediate concerns are based in Sulawesi, Indonesia, but many of the challenges are common throughout the Indo-Pacific and often beyond. Parks etc can only be an option for a minority of the vast areas involved, if only because of the costs of both setting up and running them. I feel that low-cost low-tech largely local resource based approaches need to be found, which could affordably and realistically be applied more widely than Marine Parks. Hence the pilot project I am involved in - which is still at a preparatory stage. Please contact abigailmoore@hotmail.com

M.K. Ram Mohan - seeks references on reproductive biology, induced maturation and cross fertilization of echinoderms, also triploid or polyploid studies.

Payikat Sahadevan Asha (Tuticorin, India) requests reprints on the induced maturation, spawning and asexual reproduction in holothurians.

Tahera, Q. - would appreciate any publication on echinoderms related to taxonomy, systematics, reproduction, larval distribution and biodiversity.

☆ ANNOUNCEMENTS ☆

Giudice, G. - organized an "ICRO" theoretical-practical course on "sea urchin eggs and embryos as model cells" which was held in Oristano, Sardinia, Italy (International Marine Centre) from September 17 - October 1, 1997, to which 18 people from 14 countries participated. I also organized (same location) a satellite symposium on "cell division and sea urchin development".

Grygier, M.J. - has prepared a checklist of all nominal extant species of Myzostomida (not fossil *Myzostomites*) including original name, any subsequent spellings and generic reassignments and supposed synonymies, and notes concerning outstanding nomenclatural issues. It is up-to-date as of mid-July, 1997. Copies of this "List of Nominal Species of Myzostomida" are available upon request from Mark J. Grygier (grygier@lbm.go.jp).

Václav Petr - Zoological Library, Charles University, Praha.

My personal bibliography is now accessible at the location <http://lib.natur.cuni.cz/BIBLIO/PETR.HTM> and also includes some free available articles (especially the article on the first occurrence of a brittlestar bed in Bohemia and my large article on the extinctions in the fossil record). This bibliography will be continually updated.

From Dora Maria Cunha de Jesus -

The Echinoderm Specialist Vasco M.A.M. Marques, (Dept. Zoologia & Antropologia, Fac. Ciências de Lisboa, Rua Da Escola Politécnica, P-1200 Lisboa, Portugal) died in 1985 with cancer. His Ph.D. Dissertation was published after his death by the Instituto Hidrográfico (Portuguese Navy), in 1987, under the title: "A Plataforma Continental do Algarve. Definição Qualitativa das Biocenoses de Substrato Móvel" (The Algarve's Continental Shelf. Qualitative definition of soft bottom biocenoses).

From Elizabeth Balser -

Readers are encouraged to attend the **Society of Integrative and Comparative Biology Annual Meeting, Jan 6-10, 1999, in Denver**. Of particular interest to echinoderm biologists is a symposium titled "Evolution of Starfishes: Morphology, Molecules, Development, and Paleobiology".

☆ ECHINODERM WEB PAGES ☆

Francesco Bonasoro - <http://imiucca.csi.unimi.it/~echino/Sece7.htm>

Thomas Brey - <http://www.awi-bremerhaven.de>

Jon Eggert - (contact: midvangur@islandia.is). Reference Page
http://www.islandia.is/~midvangur/new_page_8.htm

Reimund Haude - <http://www.gwdg.de/~uggpwww/>

Thomas Kammer - <http://www.geo.wvu.edu/~kammer/welcome.htm>

Alexander Kerr - http://peaplant.biology.yale.edu:8001/~jklab/alex_kerr.html

Lucas, J. - URL Aquaculture: <http://www.jcu.edu.au/dept/Aquaculture/aquacult.htm>

Christopher Mah - CAS Echinoderm Web Page
www.calacademy.org/research/izg/echinoderm/

Charles G. Messing - comatulid crinoid web pages
<http://www.nova.edu/ocean/messing/crinoids/w1title.html>

Philip Mladenov - <http://gandalf.otago.ac.nz:800/Marine/marine.htm>

Mike Reich - <http://www.uni-greifswald.de>

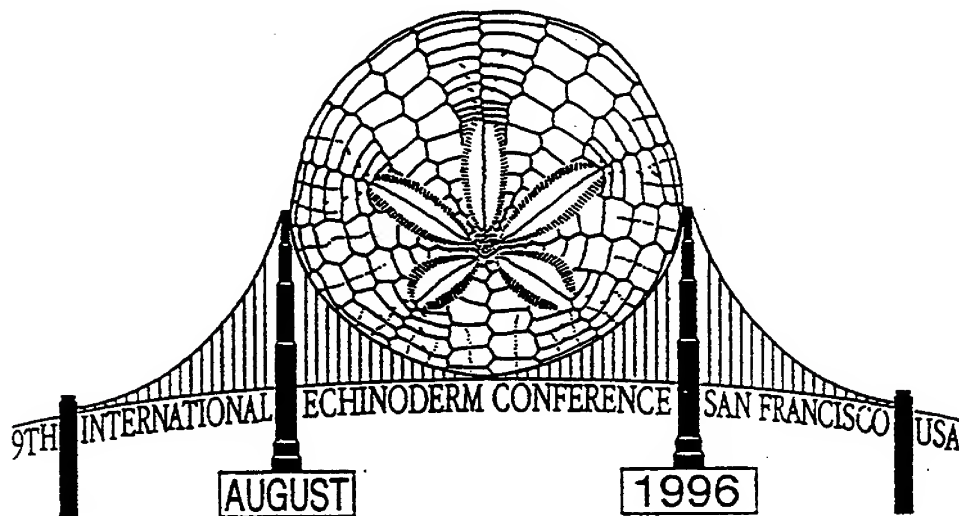
Mattias Skold - <http://www.otago.ac.nz/MarineScience>

☆ RECENT ECHINODERM PUBLICATIONS AND PAPERS IN PRESS ☆

Visit the California Academy of Sciences web page

<http://www.calacademy.org/research/izg/echinoderm/conference/>

Complete list of articles and abstracts [in] Mooi, R. and Telford, M. (Eds.) Echinoderms San Francisco. Proceedings of the 9th IEC, San Francisco, California. Balkema, Rotterdam



- Agatsuma, Y., K. Matsuyama, and A. Nakata. 1996. Seasonal changes in feeding activity of the sea urchin *Strongylocentrotus nudus* in Oshoro Bay, southwestern Hokkaido. Nippon Suisan Gakkaishi, 62:592-597. (in Japanese).
- Agatsuma, Y., and T. Kawai. 1997. Seasonal migration of the sea urchin *Strongylocentrotus nudus* in Oshoro Bay of southwestern Hokkaido, Japan. Nippon Suisan Gakkaishi, 63:557-562. (in Japanese).
- Agatsuma, Y., K. Matsuyama, A. Nakata, and N. Nishikawa. 1997. Marine algae succession on coralline flats after removal of sea urchins in Suttu Bay on the Japan Sea coast of Hokkaido, Japan. Nippon Suisan Gakkaishi, 63:672-680. (in Japanese).
- Agatsuma, Y., S. Nakao, S. Motoya, K. Tajima, and T. Miyamoto. Relationship between year-to-year fluctuations in recruitment of juvenile sea urchins *Strongylocentrotus nudus* and seawater temperature off

- the Sea of Japan coast in southwestern Hokkaido. Fisheries Science. (in press).
- Agatsuma, Y. Gonadal growth of the sea urchin *Strongylocentrotus nudus* sampled from tropically poor coralline flats and fed excess kelp *Laminaria religiosa*. Fisheries Science (in press).
- Agatsuma, Y. Ecological studies on the population dynamics of the sea urchin *Strongylocentrotus nudus*. Sci. Rep. Hokkaido Fish. Exp. Stn. (in Japanese) (in press).
- Ameziane, N., and M. Roux. 1997. Biodiversity and historical biogeography of stalked crinoids (Echinodermata). Biodiversity and Conservation, 6:1557-1570, 8 fig., 1 tabl.
- Arakaki, Y., T. Uehara, and I. Fagoonee. 1998. Comparative studies of the genus *Echinometra* from Okinawa and Mauritius. Zool. Sci. 15:159-168.
- Aronson, R. B., and D. B. Blake. 1997. Predation and the paleoecology of suspension-feeding echinoderms. In Echinoderms: Notes for a Short Course. Paleontological Society Papers 2, 1997.
- Aronson, R.B., D.B. Blake, and T. Oji. 1997. Retrograde community structure in the Late Eocene of Antarctica. Geology, 25(10):903-906.
- Aronson, R.B., and W.F. Precht. 1997. Stasis, biological disturbance, and community structure of a Holocene coral reef. Paleobiology, 23(3):326-346.
- Ausich, W.I. 1996. Phylum Echinodermata, p. 242-261. In R.M. Feldmann (ed.), Fossils of Ohio. Ohio Division of Geological Survey, Bulletin 70.
- Ausich, W.I. 1997. Regional Encrinites: A Vanished Lithofacies. In Brett, C.E., and G.C. Baird (eds.). Paleontological Events Stratigraphic, Ecological, and Evolutionary Implications. Columbia University Press, New York, N.Y. Chapter 19, pp. 509-519.
- Ausich, W.I. 1997. Calyx plate homologies and early evolutionary history of the Crinoidea. Paleontological Society Papers, 3:289-304.
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☆ HOW I BEGAN TO STUDY ECHINODERMS. ☆

PART 8.

John Lucas, James Cook University, Australia

I began to study echinoderms due to a villain.

My story goes back to the late 60s and early 70s when I was a new lecturer at James Cook University in northern Queensland. My PhD at University of Western Australia had been on various aspects of the biology of an insignificant group of spider crabs. It involved experimental studies on their ecophysiology. Thus, when I was appointed to JCU in 1968, I went there with plans to research crustaceans of the Great Barrier Reef. My plans were soon dashed. It was only possible to get out to the reefs nearest to Townsville by a 3 hour boat trip and these boat trips were organised by a shell-collectors' club. The trips only went out in winter months on days of spring low tides (to enable the shell-collectors to walk on the reef at low tide) and they only went out in calm weather. I waited through months of cancelled trips, due to bad weather, before I got out to the Great Barrier Reef. The coral reef community that I saw was overwhelming in beauty and complexity. It did not seem possible to take any component and research it in a sensible fashion. Thus, I gave up the idea of working on crustaceans of the GBR and looked to working on the intertidal crabs of the local mangroves (more than 40 crab species).

Then along came *Acanthaster planci*, the Crown-of-thorns starfish, "eating its way southwards" along the GBR in the late 60s. The late Dr Robert Endean, who was always prepared to give a strong opinion, stirred up public concern through the media. There was sufficient public concern about this villainous starfishes' threat to the GBR that Queensland government funds were made available for research into its ecology and coral damage. By chance, I became involved in a minor way with the Queensland government group that was researching the starfish. Although the larvae of *Acanthaster* were totally different to those of the crustaceans that I had previously worked with, I offered to have a go at rearing these larvae and was successful. There they were: tiny 5-armed starfish that subsequently grew and added arms.

Federal government funding was allocated for research on *Acanthaster* and I had a head start in the competition for funding with my experience of researching the early lifecycle. I then started from the hypothesis that the high fecundity of this starfish is the source of "plagues" in combination with environmental factors that strongly influence the survival of the initial tens of millions of eggs and larvae. Hence I engaged in a series of laboratory studies on the lifecycle of *Acanthaster* and environmental factors influencing the various stages. The problem of

access to the GBR was solved through obtaining enough funding to hire a small fast boat to go out to the reef according to my needs for starfish. The problem of identifying a manageable research topic was solved by the villain.

Ultimately, I teamed up with the eminent echinodermologist, Dr. Chuck Birkeland of University of Guam, to produce a book, "*Acanthaster planci*: Major Management Problem of Coral Reefs", CRC Press. We complemented each other's interests, in that Chuck's interests were primarily in field studies while mine were primarily in laboratory studies. Unfortunately, the book did not become an international best seller (probably its price ensured that it was strictly in the category of a library purchase).

The Crown-of-thorns starfish is still a "villain" in the destruction that it causes to many coral reefs in the Indo-Pacific region. We now know a lot about its biology and ecology, but there are still fundamental questions about the "plagues" that remain unanswered. These big questions are now in hands of the newer generation of coral reef ecologists and echinodermologists.



Ram Mohan M.K. (MRC of CMFRI, Tamilnadu, India).

After completing the course work of my Ph.D. program, I was fortunate to be put under Dr. D.B. James, the eminent Echinoderm specialist, to work on Echinoderms. At that time I had very limited knowledge of echinoderms, particularly confined to starfishes. Later we were asked to give two credit seminars as a part of our program, for which I selected the topics on holothurian resources and reproductive biology of some holothurians seen in India. While preparing for these seminars I had a fair amount of reading on not only holothuroids but also echinoderms in general. Slowly but steadily I developed an interest in the group. At CMFRI, Cochin and also during my brief stay at Tuticorin, I came across a good deal of literature, which gave me more insight into the characteristics of echinoderms, particularly taxonomy, diversity and reproductive features. At present I am doing my research on reproductive biology of holothurians. There is only one word which comes to mind when I think of echinoderms - 'Namasthe' (the Indian equivalent for Salute).





Payikat Sahadevan Asha. (T.R.C. of CMFRI, Tuticorin, India).

During my post-graduation, I was not having much idea on sea cucumbers. After that I got through the Agriculture Research Service as a scientist in C.M.F.R.I. I was in Fisheries Environmental Management Division and was very much eager to know about the projects allotted to me. After one month I got the transfer along with the projects allotted. I was surprised to know that I have to work under an eminent Senior Scientist Dr. D.B. James. I was very much enthusiastic to collect much information about sea cucumbers. After my preliminary discussion with Dr. James, I came to know that my knowledge is very poor, and I have to work a lot. When I started working, I could understand that the echinoderm - sea cucumber is an interesting animal group both economically and experimentally and it is the responsibility of all to conserve them as a scavenger of marine environment.



Robert Singletary (University of Bridgeport, Connecticut)

In the late 60's I was a new graduate student in Hilary Moore's laboratory. At that time the research focus was on the autoecology of the animals that made up the benthic community of Biscayne Bay. While many of the animals in the community had been studied, no one had tackled the most abundant animals, the brittle stars. Therefore, I naively decided that would be a fruitful research area. I soon found out why these animals were avoided, the brittle part of their name was their most impressive characteristic. It seemed that all you had to do was look at these animals and they would break apart. Additionally, we were in Miami, Florida, within easy reach of coral reefs, and the animals I chose to study lived in the muddy bottoms of turbid Biscayne Bay. Still the research was rewarding, and I was able to visit the reefs to obtain comparative information. I also learned what fascinating animals echinoderms are and I continue to marvel at them.



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AFRICA

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- Webster, G.D. Palaeobiogeography of Tethys Permian Crinoids. Strzlecki International Symposium on the Permian of eastern Tethys: Biostratigraphy, Palaeogeography and Resources. Melbourne, V., Australia, Nov. 1997.
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- Jesus, D., and L. Cancela da Fonseca. Echinoderm new species for the southwest coast of Portugal. **2nd Symposium on the Atlantic Iberian Continental Margin, Cádiz, 17-20 September 1997.**
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- James, D.B. Sea cucumber hatchery and culture prospects. **National Aquaculture Week Workshop at Tuticorin. Organised by the Aquaculture Foundation of India, Madras, 7/2/97.**
- James, D.B. On biotoxicity in echinoderms. **National Symposium on Recent Developments in Natural Products. Organised by the Department of Chemistry, Andhra University, 12/7/97.**
- James, D.B. Sea cucumber culture and seed production at the Indo-Egyptian Workshop on Oceanography with exclusive focus on mariculture. **Organised by the Central Marine Fisheries Research Institute, Kochi, 9/12/97.**

JAMAICA

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JAPAN

- Zito, F., V. Tesoro, D.R. McClay, E. Nakano, and V. Matranga. Extracellular matrix and skeletogenesis in the sea urchin embryo. **68th Ann. Meeting of the Zool. Soc. Japan, Nara, Japan, 2-4 Oct. 1997.**

PAKISTAN

- Tahera, Q., and I. Nayeem. Occurrence of echinoderm larvae in Pakistan waters. **Workshop on Coastal Aquaculture, 23-25 April 1996. Karachi, Pakistan.**
- Tahera, Q. An addition to the existing fauna of the family Cucumariidae (Holothuroidea: Echinodermata) from Pakistan. **17th Pak. Congr. Of Zool., 5-7 April 1997, Karachi, Pakistan.**

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UNITED STATES

- Adams, N.L. The effects of and defenses against ultraviolet radiation on reproduction and development of sea urchins. **Third Annual EPA STAR Graduate Fellowship Conference, Arlington, VA, June 1998.**
- Andacht, T.M. Metal binding proteins are involved in fertilization envelope elevation in the sea urchin, *Lytechinus variegatus* (Lamarck). **Developmental Biology of the Sea Urchin XI, Marine Biological Laboratories, Woods Hole, MA, 10-14 September 1997.**
- Arakaki, Y. A comparative ecological and reproductive study on the four types of sea urchin *Echinometra mathaei* (Blainville) on Okinawa reef flat. **9th International Echinoderm Conference San Francisco, California, USA, 5-9 August 1996.**
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- De Ridder, C., and R.L. Brigmon. A symbiotic relationship between spatangoids (Echinoidea) and *Thiothrix* spp. **96th General Meeting of the American Society for Microbiology, New Orleans, Louisiana (USA). May 1996.**
- Donovan, S.K. 1997. Taphonomy of Caribbean Cenozoic echinoids. **Geological Society of America North-Central Section Meeting, Madison, Wisconsin. Geological Society of America Abstracts with Programs, 29(4): 13.**
- Donovan, S.K. & Harper, D.A.T. 1997. Crinoids and brachiopods in the Miocene of the Antillean region. **Geological Society of America Annual Meeting, Salt Lake City, Utah, 20-23 October. Geological Society of America Abstracts with Programs, 29(6): A405.**
- Gielazyn, M.L. Subsurface feeding behavior of the burrowing ophiuroid *Microphiopholis gracillima* (Stimpson) (Echinodermata). **The Benthic Ecology Meeting, Melbourne, Florida, March 1998.**
- Lane, N.G. 1. Age and Revision of Whidborne's (1898) Echinoderms from the Lower Pilton beds (Famennian) of the type Devonian. 2. A time-line for the pre-1700 literature on fossil and living crinoids. **Abstracts. Geological Society of America meeting, Salt Lake City, October 1997.**
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- Miller, R.J. Rapid ingestion of sinking organic matter by bathyal surface deposit-feeders, as indicated by Th-234. **Deep-Sea Biology Meeting, Monterey, California, October 1997.**
- Oyen, C.W., and R.W. Portell. Biostratigraphy, paleobiogeography, and facies relationships of Cenozoic echinoids from Florida. **Geological Society of America Ann. Mtg. Abstr. With Prog. 29(6): 404, Salt Lake City, Utah, October 20-23, 1997.**
- Oyen, C.W., and R.W. Portell. Temporal and areal patterns of fossil echinoids in Florida: another tool to interpret facies distributions. **Georgia Academy of Science Annual Meeting 56(1):57-58, April 24-25, 1998, Savannah, GA.**
- Oyen, C.W., K.B. Fountain, R.W. Portell, and G.H. McClellan. Phosphatized brachiopod, echinoid, and annelid fossils from the upper west Florida slope, eastern Gulf of Mexico. **Geological Society of America SE Section, Abstr. With Prog. 30(4):53-54, Charleston, West Virginia, March 30-31, 1998.**

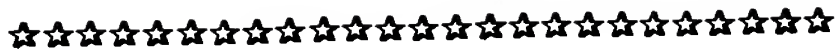
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Papers on Echinoderms presented at the XIV Zoology National Congress, November 4th -7th 1997, Guanajuato, Guanajuato, México.

(Communicated by Francisco Solís-Marín).

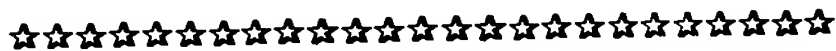
- Nepote G., and C. Ana. Sistemática de los holoturoideos (Echinodermata: Holothuroidea) de Bahía de Banderas, Jalisco, Nayarit, México.
- Gutiérrez Castro, Adriana I., and F.A. Solís-Marín. Equinoideos (Echinodermata: Echinoidea) de profundidad en el Golfo de México.
- Solís-Marín, F.A., and Frontana Uribe Sarita C. *Ocnus suspectus* (Ludwig) (Echinodermata: Holothuroidea) un nuevo registro para el Caribe mexicano.
- Castro-Lozano, E.L., S. Ariza-Mancio, and F.A. Solís-Marín. Nuevo registro de ofiodermátido (Echinodermata : Ophiuroidea) del Caribe Mexicano.
- Lara López, A. L., A. Saucedo García, and F.A. Solís-Marín. Listado. Sistemático de los equinodermos (Echinodermata) del estado de Guerrero, México.
- Benítez Villalobos, F., and A. Estrada Vargas. Los equinodermos de la zona intermareal de Santa Elena, Oaxaca.
- Ariza-Mancio, S., and F.A. Solís-Marín. Crecimiento y distribución de *Rhyncholampas pacificus* A. Agassiz (Echinodermata: Echinoidea).
- Mata Pérez, E. & Laguarda-Figueras, A. Principales factores bio-abióticos que afectan la distribución de la Familia Luidiidae (Echinodermata: Asteroidea), en las costas de México.

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The Fourth Annual Florida Echinoderm Festival was held at Jacksonville University on 25 October 1997, organized by Dr. Lee Ann Clements.

The next Festival will be at the University of South Florida in autumn, 1998.



Western Society of Naturalists Meeting, Monterey, California, Dec 26-30, 1997.

(Communicated by Christopher Mah).

- Ahlgren, M.O. Sheldon Jackson College, Sitka, AK. Seasonal changes in body composition and diet of red sea cucumbers (*Parastichopus californicus*) near Sitka, Alaska.
- Bolden, S.R., and G.C. Jensen. Allegheny College, Meadville, PA and Shannon Pt. Marine Center, Anacortes, WA. Digging for dollars: predator-prey interactions within beds of *Dendraster excentricus*.
- Bingham, B., J. Burr, and K. Chun. Huxley College, Western Wash U. Bellingham, WA; Biol. Dept. U. Puget Sound, Tacoma. WA; Zoology Dept., Brigham Young, U. Provo, UT. Causes and consequences of arm loss in the starfish *Leptasterias hexactis*.
- Dalby, J.E., Jr., W.G. Ambrose, Jr., and P.E. Renaud. Biology Dept. Bates College, Lewiston, Maine. Do ice cover and food supply affect growth of arctic ophiuroids?
- Garza, D.D. and C.D. Robles. Dept. of Ecology, Evolution and Marine Biology, University of Calif, Santa Barbara; Dept. of Biology and Microbiology, UCLA. The effect of freshwater incursions on diel movement of *Pisaster ochraceus* in a Pacific northwest rocky intertidal community.
- James, D.W. Moss Landing Marine Labs. The biology of the sea urchin *Toxopneustes roseus* in rhodolith beds in Baja California Sur, Mexico.
- Konar, B. UC, Santa Cruz. Kelp stand persistence adjacent to urchin Barrens.
- Lambert, P. Royal BC Museum Victoria, B.C. Canada. Recent additions to the holothuroid fauna of the northeastern Pacific Ocean (Echinodermata).
- Mah, C. Dept. of Invert. Zool, CAS, Golden Gate Park, San Francisco, CA. Phylogeny and taxonomic revision of the Brisingida (Asteroidea).

- McAlary, F. and T. Turney. Friday Harbor Labs, WA; Catalina Isl. Conservancy. Kelp, urchins, and ocean climate at Catalina Island.
- McNaught, T. D.C. Univ. of Maine, Darling Marine Center. Are populations regulated by supply or post-settlement mortality? Algal habitat effects on settlement and survival of the green sea urchin.
- Medeiros-Bergen, D.E., and T.A. Ebert. Dept. of Mathematics and Science, Boston University Boston and Dept. of Biology, San Diego State University, San Diego, CA. Selective constraints on brittlestars with contrasting development modes.
- Selivanova, O.N., and E.A. Arkhipova. Kamchatka Inst. of Ecology, Petropavlovsk-Kamchatsky, Russia. Changes in algae-sea urchin communities of the Avacha Bay (Kamchatka) caused by pollution.
- Vicknair, K.E., J.S. Pearse, J.A. Estes, J.B. McClintock. UC Santa Cruz and University of Alabama, Birmingham. When keystones collide: sea otters and sea stars.



Annual Meeting of the Florida Association of Benthologists St. Petersburg, Florida. 2-3 December 1998.

(contributed by J.M. Lawrence)

- Tan, Chih-Yi. Variability in size-frequency distributions of populations of the sand dollar *Mellita tenuis* over space and time.
- Hill, Sophie, and John Lawrence. Microhabitats of co-occurring sea urchins *Lytechinus variegatus* and *Arbacia punctulata* on the Florida gulf coast shelf.
- Lawrence, John, Reinaldo Rios, and Paul Llobet. The sand dollar *Mellita tenuis* and the starfish *Luidia senegalensis* at Naples, Florida.



Annual Meeting of the World Aquaculture Society Las Vegas, Nevada. 15-19 February 1998.

(contributed by J.M. Lawrence)

- Agatsuma, Yukio. Urchin aquaculture in Japan.
- Burke, Brian G. Sea urchin gonad enhancement: economic feasibility analysis.
- Cook, Elizabeth, and Maeve Kelly. Gonad development and somatic growth in the green sea urchin *Psammechinus miliaris* fed artificial and natural diets.

- Garrido, Carolina L., and Bruce J. Barber. Effects of temperature and food ration on gonad growth and gametogenesis of the green sea urchin *Strongylocentrotus droebachiensis*.
- Grosjean, Philippe, Christine Spirlet, and Michel Jangoux. Is land-based closed cycle echinoculture (sea urchin aquaculture) a viable alternative to fisheries today?
- Kelly, Maeve S. Factors influencing the asomatic and somatic growth of the sea urchin *Psammechinus miliaris* when maintained in polyculture with the Atlantic salmon.
- Keesing, John, Karina C. Hall, and Steven M. Clarke. Review of status of world sea urchin fisheries points to opportunities for aquaculture.
- Lawrence, Addison, John Lawrence, Joseph Kearnes, and Galen Rokey. The development of prepared feeds for sea-urchin aquaculture.
- Lawrence, John, and Alexander Bazhin. The use of life-history characters to evaluate the potential of sea urchins for aquaculture.
- Lesser, Michael P., and Charles W. Walker. Over exploitation of the urchin fishery: does history repeat itself and is there anything we can do to insure a sustainable yield to the market.
- McBride, Susan C., John Lawrence, and Addison Lawrence. Growth, feeding rate, and feeding efficiency of small sea urchin *Strongylocentrotus franciscanus* fed prepared feeds of three protein levels.
- McGinn, Nature A., Michael P. Lesser, and Charles W. Walker. The influence of temperature and photoperiod on vitellogenesis in the green sea urchin *Strongylocentrotus droebachiensis*.
- Pantazis, Panos A., and Maeve S. Kelly. Production of artificial diets from cast macroalgal fronds and commercial raw materials for the sea urchin *Psammechinus miliaris*.
- Walker, Charles W., and Michael P. Lesser. Manipulation of food and photoperiod out-of-season gametogenesis in the green sea urchin *Strongylocentrotus droebachiensis*: implications for land-based aquaculture.
- Watts, Stephen A., S. Anne Boettger, James B. McClintock, and John Lawrence. Assessment of *Lytechinus variegatus* as a fishery and aquaculture candidate in the Gulf of Mexico.



Papers presented at the Annual Meeting of the Society for Integrative and Comparative Biology, 3-7 January, 1998, Boston, Massachusetts. Abstracts in the American Zoologist, 37(5), 1997.

(Contributed by J. M. Lawrence)

- Cuet, P., P. Chabanet, C. Conand, Y. Letourneur, T. Lison de Loma, D. Mioche, O. Naim, and S. Semple. Eutrophication on the St-Gilles la Saline reef complex (Reunion): a synthesis of pluridisciplinary works. (poster). p.168A.
- Flammang, P. What can footprints tell us about temporary adhesion of seastar podia. p.179A.
- Hendler, G., and M.J. Grygier. Babysitting brittle stars; first report of intergeneric symbiosis among Ophiuroidea. p.55A.
- Hoffman, J.R. The good, the bad, and the ugly: UV-induced developmental difficulties in the sand dollar *Dendraster excentricus*. p.192A.
- Janies, D. Xyloplax is an asteroid. p.195A.

- Klinger, T.S., J.A. Sampsell, and C.R. Johnson. Sediment enrichment and nutrient absorption by Aspidochirotida (Echinodermata: Holothuroidea) of Heron Island, Great Barrier Reef. p.56A.
- Lee, S.E. A molecular comparison between species within the diadematid urchin genus *Centrostephanus* (Echinoidea). p.58A.
- Leong, P.K.K., and D.T. Manahan. Changes in Na⁺, K⁺-ATPase activity during development of an Antarctic sea urchin. p.123A.
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Papers presented at the XVIII Congreso de Ciencias del Mar, Iquique, Chile, 4-8 May 1998.

(Communicated by J.M. Lawrence)

- Barahona, N., and G. Jerez. La pesquería del erizo (*Loxechinus albus*) en las Regiones X a XII de Chile: 13 años de historia (1985-1997).
- Lawrence, J.M. Energy budgets, life-history strategies and the potential of sea urchins for aquaculture.
- Lozada, E., and P. Figueroa. Sobre la fecundidad del erizo *Loxechinus albus* en Melinka, XI Región.

- Soto, R. Estado actual del conocimiento de los equinodermos en la zona norte de Chile y su relación en eventos "El Niño".
- Stotz, W., C. Valladares, E. Pérez, and S. Marín. Fallas en el reclutamiento de las poblaciones del erizo rojo *Loxechinus albus* en la XII Región: sus implicancias para la administración del recurso.
- Stotz, W., C. Valladares, E. Pérez, and S. Marín. Estimaciones de mortalidad para el erizo rojo *Loxechinus albus* en la XII Región.
- Vásquez, J., and J. Vega. Ecología de asteroideos submareales del norte de Chile.
- Volbehr, U. Ecología y nutrición de *Anasterias antarctica* (Luetken, 1856) (Echinodermata: Asteroidea) y *Pseudechinus magellanicus* (Echinodermata: Echinoidea) en una playa de bloques y cantos: Bahía Laredo, Región de Magallanes.



North American Echinoderms Meeting, Wallops Island, Marine Science Center, Wallops Island, Virginia, August 16-19, 1998. Program and Abstracts.

(Communicated by Thomas Scott Klinger)

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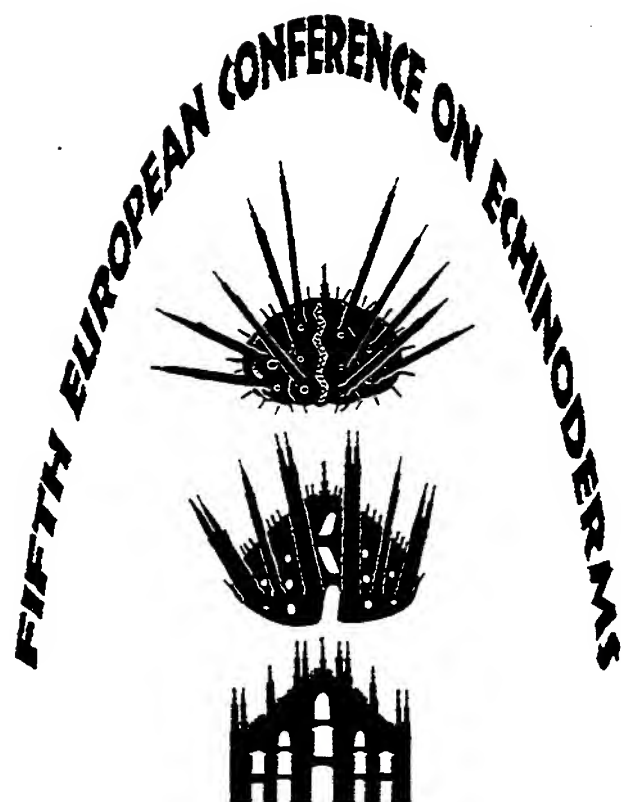
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(Communicated by Daniel Blake)

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MILANO, 7TH-12TH SEPTEMBER 1998

University of Milano,
Department of Biology
"Luigi Gorini"

PROGRAM

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LIST OF ABSTRACTS
☆ 5TH EUROPEAN CONFERENCE ON ECHINODERMS ☆

This is the complete list of abstracts of the 5th European Conference on Echinoderms that will be held in Milan from 7th to 12th September 1998.

Visit the University of Milan web page for more information regarding the conference (including participants, addresses and e-mails).

<http://imiucca.csi.unimi.it/echino/5ece7.htm>

(Communicated by Francesco Bonasoro)

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- Barbieri, R., V. Izzo, A.M. Pirrone, L.Toia, R. Vitturi, and G. Giudice. Lack of amplification phenomena of ribosomal RNA genes in the oogenesis of the sea urchin *Paracentrotus lividus*. Poster
- Byrne, M. Evolution of larval form in the Australian sea-star genus *Patiriella*. Oral
- Long, S., V. Morris, M. Frommer, and M. Byrne. Hox-type homeobox genes in the starfish *Patiriella exigua*. Poster
- Chee, F.C., and M. Byrne. Serotonin-like expression in the larvae of *Patiriella* species (Asteroidea) with different modes of development. Does serotonin have morphogenetic and sensory roles? Oral
- Chen, W., P.W. Beesley, and M.C. Thorndyke. Neural regeneration in *Asterias rubens* and homeobox genes. Poster
- Byrne, M., M. Thorndyke, F. Chee, P. Cisternas, and A. Feldman. Localisation of the neuropeptide S1 in the larvae of the sea star *Patiriella regularis* as revealed by confocal microscopy. Poster
- Torres, M., D. Gil, and P. Dominguez. Stable multimodal fivefold patterns in crinoids and echinoids: a general mathematical approach. Oral
- Coniglio, L., C. Angelini, M.L. Pedrotti, A. Diaspro, M. Robello, and C. Falugi. Onset of a cholinergic-like system during neurogenesis of the sea urchin *Paracentrotus lividus*. Oral
- Cocchiarella, F., A. Piscopo, E. Nargi, M. Piscopo, M. Branno, F. Aniello, and L. Fucci. Long 3' UTRs of *Paracentrotus lividus* embryo mRNAs and mRNA instability. Poster

- De Amaral, P., C. Nunes, P. Gosselin, and M. Jangoux. Comparative morphology of postlarvae in regular and irregular echinoids. Poster
- Giudice, G. The sea-urchin development: present and past. Invited Speaker
- Gosselin, P., and M. Jangoux. GABA and glutamic acid induce the metamorphosis of *Paracentrotus lividus* larvae (Echinodermata, Echinoidea). Poster
- Kelly, M.V., A.J. Hunter, and C.L. Scholfield. Factors affecting larval *Psammechinus miliaris* metamorphosis and survival at metamorphosis with particular reference to its suitability as an aquaculture species. Oral
- Zito, F., S. Sciarrino, G. Toia, A. Cusimano, R. Bonaventura, and V. Matranga. Perturbation of morphogenesis in sea urchin embryos cultured in the presence of a McAb to PI-nectin, an ECM protein. Oral
- Mito, T., and K. Endo. Conservation of the anterior region of hox gene cluster in Echinoderms. Poster
- Roberti, M., P. Loguercio Polosa, C. Musicco, R. Fiore, F. Milella, M.N. Gadaleta, and P. Cantatore. Proteins interacting with mitochondrial DNA in *Paracentrotus lividus* eggs and embryos: in vivo analysis and cDNA cloning. Poster
- Sato, Y., and I. Yazaki. Analysis of the apoptotic effects of L-Glutamine on the larval cells in sea urchin metamorphosis. Poster
- Selvakumaraswamy, P., and M. Byrne. Unusual account of an ectoderm derived coelom and the occurrence of schizocoely in ophiuroid larvae. Oral
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- Stone, J.R., and G.A. Wray. Developing morphological hypotheses among Echinoderms. Oral
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- Barnes, D.K.A., S. Steele, D. Maguire, J. Turner. Population dynamics of the urchin *Paracentrotus lividus* at Lough Hyne Ireland. Poster
- Blockmans, B., C. De Ridder. The intradigestive distribution of symbiotic ciliates in *Paracentrotus lividus*. Poster
- Borzone, C.A. Influence of *Mellita quinquesperforata* beds on the structure of subtidal benthic communities of sandy beaches. Poster
- Bulleri, F., L. Benedetti-Cecchi, and F. Cinelli. Experimental analysis on the effects of grazing of *Paracentrotus lividus* and *Arbacia lixula* in shallow subtidal reefs on the west coast of Italy (Western Mediterranean). Oral
- Candia Carnevali, M.D., S. Galassi, F. Bonasoro, G. Dina, M.A. Terlizzi, M. Patrino, and M.C. Thorndyke. PCB-induced environmental stress and the regenerative response in crinoids. Poster

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- Dominguez, P., M.A. Ramos, J.M. Remón, and M. Villena. Echinoderms from the oceanographic expedition fauna (Project fauna ibérica) and Museo Nacional de Ciencias Naturales Collections. Poster
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- Greenwood, A. Asteroid community structure in Lough Hyne Co. Cork. Oral
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- Juterzenka, K.V., D. Piepenburg, and M. Schmid. Winning team of omnivores? Response of arctic ophiuroids to organic input. Oral
- Deheyn, D., E. Lamarque, and M. Jangoux. Arm regeneration in *Amphipholis squamata*. Poster
- Lane, D.J.W. A population survey of the "rare" stichopoid sea cucumber, *Thelenota rubralineata*, off northern Sulawesi, Indonesia. Oral
- Lefebvre, A., and D. Davoult. Vertical distribution of the ophioplutei of *Ophiothrix fragilis* (Echinodermata: Ophiuroidea) in the Dover strait (Eastern English Channel). Poster
- Mac Cord, F.S., and L.F.L. Duarte. Patterns of spatial distribution in populations of *Tropiometra carinata* (Lamarck) (Crinoidea: Comatulida) at São Sebastião, São Paulo, Brazil. Poster
- Pastore, M. Echinoderms of the Gulf of Taranto (Mediterranean, Ionian Sea). Poster
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- Nilsson, H.C. Interaction between water flow, oxygen depletion and sublethal predation on growth of the brittle star *Amphiura filiformis*. Oral
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- Scheiblaue, S., and T. Reinthaler. Ecological monitoring of *Holothuria tubulosa* and *H. polii* (Echinodermata: Holothuroidea) in nearshore waters of Elba, Italy. Poster
- Skern, R., N.T. Hagen, and E.N. Hegseth. Benthic algal spores do not survive digestion by *Strongylocentrotus droebachiensis*. Poster
- Stübing, D., W. Hagen, and D. Piepenburg. Feeding ecological of arctic Echinoderms: evidence from lipid and stomach content analyses. Poster

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- Borisovets, E.E., N.V. Lepskaya, and E.V. Yakush. Biological and biochemical features of formation of sea urchin (genus *Strongylocentrotus*) gonad colour. Poster
- Deheyn, D., N. De Bremaeker, D. Vaitilingon, and J. Mallefet. Immunolocalization of SALMFamide neuropeptides S1 and S2 in *Ampipholis squamata* (Ophiuroidea, Echinodermata). Poster
- Grawe-Baumeister, J. Morphological comparison of the Upper Jurassic sea urchin *Gymnocidaris agassizii* and the recent *Heterocentrotus mammillatus* and the palaeoecological conclusions. Oral
- Kaburek, M., and H. Hilgers. The axial-hydrocoel complex of the endemic Mediterranean heart urchin *Schizaster canaliferus* (Echinoida: Spatangoida). Poster
- Lawrence, J.M., and C.M. Pomory. Eccentricity of the test and Aristotle's lantern in sand dollars (Echinodermata: Echinoidea: Clypeasteroida). Poster
- McKenzie, J.D., C. Bavington, M. Grundy, and N.V. Richardson. Why do Echinoderms not foul? Role of proteoglycans. Oral
- Miguez-Rodriguez, L.J., and V. Urgorri. Morphology of the calcareous structures of *Psolidium complanatum* Cherbonnier, 1969 (Echinodermata, Holothuroidea) using a scanning microscopy. Poster
- Grosjean, P., C. Spirlet, and M. Jangoux. Comparison of three body-size measurements for echinoids and their use in growth and gonadosomatic calculation. Poster
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- Andrietti, F., M.D. Candia Carnevali, F. Bonasoro, and I.C. Wilkie. Swimming and righting behaviour in *Antedon mediterranea*. Oral
- Birenheide, R., and T. Motokawa. Influence of K⁺ and neurotransmitters of stiffness and contraction of crinoid arm ligament. Poster
- Boettger, S.A., and J.B. McClintock. Behavioural responses of *Lytechinus variegatus* during chronic exposure to inorganic and organic phosphates. Poster
- Montero-Torreiro, M.F., J.L. Catoira-Gomez, G. Mosquera-Tallon, P. Garc a-Mart nez. Seasonal variation in some enzyme activities of mixed-function oxygenase (MFO) system in gonads of the sea urchin *Paracentrotus lividus*. Poster
- De Bremaeker, N., J. Mallefet, F. Baguet. Neuromodulatory effects of catecholamines and purines on the luminescence *Ampipholis squamata* (Ophiuroidea). Oral

- Dupont, S., F. Bieswal, and J. Mallefet. Characterization of a population of *Amphipholis squamata* (Ophiuridea) from Oliveri-Tindari's lagoon (Sicily). Poster
- Hagen, N.T., Å. Andersen, and O.B. Stabell. Alarm response of *Strongylocentrotus droebachiensis* induced by chemical labelling of *Anarhichas lupus*. Oral
- Hill, S.K. The effects of food level and temperature on the energy budget of *Arbacia punctulata* (Arbaciidae) and *Lytechinus variegatus* (Toxopneustidae). Oral
- Hollertz, K. Response to food by the heart urchin *Brissopsis lyrifera*. Oral
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- Lison De Loma, T., C. Conand, and M.L. Harmelin-Vivien. Nycthemeral feeding rhythm and absorption efficiency of the echinoid *Tripneustes gratilla* on a coral reef of Reunion island (Indian Ocean). Oral
- Mallefet, J. Physiology of Bioluminescence in Echinoderms. Invited Speaker
- McKew, M., and I.C. Wilkie. Organisation and physiology of the compass elevator muscles of the sea-urchin *Echinus esculentus*. Poster
- Stancyk, S.E. Predatory behaviour of Echinoderms. Invited Speaker
- Wilkie, I.C., M.D. Candia Carnevali, and F. Bonasoro. Evidence for the "cellular calcium regulation hypothesis" from "simple" mutable collagenous structure: the brachial and cirral syzygial ligaments of *Antedon mediterranea*. Oral

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- Ausich, W.I. Origin of Crinoids. Invited Speaker
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- Bohn, J., A.V. Smirnov, and T. Heinzeller. Comparison of the Bourgueticrinid and Isocrinid aboral nervous system, possible phylogenetic implications. Poster
- David, B., B. Laurin, T. Choné, and F. Magniez. Morphological disparity in the genus *Echinocardium* (Echinoidea: Spatangoida). Oral
- Dean, J. The Ordovician divergence of asteroids and ophiuroids. Oral
- De Ridder, C., and S. Weinberg. *Asthenosoma marisrubri* n. sp. and *Asthenosoma varium*, the story of a confusion. Poster
- Dominguez, P. Early evolution of Echinoderms: class Ctenocystoidea revisited. Oral
- Dominguez, P., D. Gil, and M. Torres. Early Rhombifera (Lower Paleozoic Cystoids): morphology and function. Poster
- Gil, M., and P. Dominguez. Taxonomic diversity of lower-middle Cambrian Echinoderms and Carpoids from Spain. Oral

- Gil, D., P. Dominguez, and M. Torres. Ordovician evolutionary faunas of Echinoderms and Carpoids from southern Spain. Poster
- Hagdorn, H. *Traumatocrinus*, an extraordinary Triassic crinoid. Oral
- Hagdorn, H. Triassic ophiuroids (*Aspiduriella*) brooding in an empty ceratite shell. Poster
- Haude, R. Phylogeny of Scyphocrinoids (u. Silurian - l. Devonian) in relation to their extraordinary bladder-like root. Oral
- Heinzeller, T., and U. Welsch. The echinoderm complex of hydrocoel/ectoneural cord and the chordate complex of notochord/neural plate - analogous or homologous? Poster
- Hess, H. Habitat and lifestyle of crinoids from some fossil assemblages. Oral
- Ishida, Y., and F. Fujita. Dense population of fossil and extant *Ophiura sarsii* (Echinodermata, Ophiuroidea) in Japan. Oral
- Indeherberge, L., E. Defour, R. van der Ham, and J.W.M. Jagt. What is *Micraster ciplensis* Schlüter, 1897? (Late Cretaceous Echinoids). Poster
- Jagt, J.W.M. Echinoderms and the K/T boundary in the Maastrichtian type (SE Netherlands, NE Belgium). Poster
- Jagt, J.W.M. Notes on two late Cretaceous comatulid crinoid genera. Poster
- James, D. The phylogeny of Echinodermata: total evidence and parameter sensitivity. Oral
- Jefferies, R.P.S. Which way up were the Mitrates? - Flat surface up. Oral
- Jeffery, C.H. Brooding it over: the first occurrence of nonplanktotrophy in echinoids. Oral
- David, B., B. Lefebvre, R. Mooi, R. Parsley. Homalozoans in the light of the extraxial-axial theory of skeletal homologies. Oral
- Lessios, H.A., B.D. Kessing, and J.S. Pearse. World-wide phylogeny of *Diadema*. Oral
- Madon-Senez, C. Plate pattern of echinoid tests: relative length of the labrum and of the sternal plates in recent antarctic schizasterids (Spatangoida). Poster
- Manni, R., and U. Nicosia. The oldest cyrtocrinid, *Nerocrinus petri* n. gen. n. sp., and the Nerocrinidae n. fam. Oral
- McNamara, K.J. Biogeographic evolution of cenozoic Echinoids in western Australia. Oral
- Milsom, C. Rovings of the Roveacrinids. Oral
- Moussa, B., D. Neraudeau, J. Lang, and E.P. Verrecchia. Characterization of the morphological variability in *Linthia* (Maastrichtian/Paleocene Echinoid of Iullemeden Basin; West Africa). Poster
- Nebelsick, J. Taphonomic legacy of predation on Echinoids. Oral
- Nebelsick, J., and A. Kroh. Palaeoecology and taphonomy of *Parascutella* beds from the Lower Miocene of the Eastern Desert, Egypt. Poster
- Néraudeau, D., and J. Roman. Impact of the Messinian crisis on the Mediterranean Echinoid fauna. Oral
- Neumann, C. Cretaceous Echinoids from Jordan. Poster
- Oji, T., and T. Mito. Skeletal development of *Oxycomanthus japonica* and its paleontologic implications. Poster
- Parsley, R.L. The Cincta (Homostelea) as Blastozoans. Oral
- Rose, E.P.F., and J.L. Wood. *Chypeaster* and *Echinolampas* (Echinoidea: Irregularia) from the neogene of south-east Spain, and the Mediterranean Messinian "salinity crisis". Oral
- Rowe, D.A., and S.K. Donovan. Spatangoid echinoids from the eocene of Jamaica. Poster
- Roy, M.S., R. Sponer, and P. Mladenov. Molecular phylogeography of *Ophiactis savignyi* (Ophiurae: Ophiactidae). Poster

- Rozhnov, S.V. The crookedness of the stem and crone of the pelmatozoan echinoderms as a result of heterochrony. Oral
- Sevastopulo, G.D., P.W. Jackson, R.J. Prokop. Functional morphology of *Pygmaeocrinus* (Disparida; Crinoidea). Oral
- Simpson, G.A., and S.K. Donovan. Fore-reef Echinoid faunas in the Pleistocene of the Antillean region: Barbados and Jamaica compared. Poster
- Smirnov, A.V. The origin and evolution of the order apodida (Holothuroidea). Oral
- Smith, A.B., and A.S. Gale. Sea-levels, sequence stratigraphy and Echinoid diversity through the Cretaceous. Oral
- Solovjev, A.N., and A.V. Markov. Fossil Pericosmid Echinoids. Poster
- Sponer, R., P.V. Mladenov, and M.S. Roy. Molecular evolution in *Amphipholis squamata*. Oral
- Sumrall, C.D., and J. Sprinkle. The early ontogeny of the glyptocystitid rhombiferan *Lepadocystis moorei*. Oral
- Thandar, A.S., and V. Rajpal. Some thoughts about the "supergenous" *Thyone* Jaeger (Echinodermata: Holothuroidea). Poster
- Villier, L., and M. Kutscher. New Lower Jurassic evidence of fossil Asteroids and comments on their diversity. Poster
- Widdison, R. Crinoid faunas of the Much Wenlock Limestone Formation of Britain. Poster

REPRODUCTIVE BIOLOGY

Developmental Biology Ecology Functional Biology Physiology and Behaviour
Paleontology and Phylogeny

- Barker, M.F. Reproduction and feeding in *Ophiopsammus maculata* (Echinodermata: Ophiuroidea) on the Otago coast, Southeastern New Zealand. Oral
- Bonasoro, F., M.D. Candia Carnevali, F. Sala, M. Patrino, and M.C. Thorndyke. Regenerative potential of crinoid arm explants. Poster
- Candia Carnevali, M.D., F. Bonasoro, M. Trezzi, and A. Giardina. Nerve-dependent myogenesis in arm regeneration of *Antedon mediterranea*. Poster
- Conand, C., and S. Uthicke. Asexual reproduction in population of *Stichopus chloronotus* (Holothuroidea): a comparison between Pacific and Indian Ocean populations. Poster
- Cook, E.J., and M. Kelly. The effects of stocking density on the growth (somatic and gonadal) and survival of the green sea urchin (*Psammechinus miliaris*). Oral
- Poulin, E., F  ral JP, Cornudella L, Alv  , V. Selfing and outcrossing in the brood protecting ophiuroid *Amphipolis squamata*. Oral
- Hoshi, M., M. Kawamura, Y. Maruyama, E. Yoshida, M. Ikeda, M. Ogiso, M. Matsumoto. Egg-jelly components responsible for the induction of acrosome reaction in the starfish, *Asterias amurensis*. Oral
- Mladenov, P.V., and Y. Achituv. Morphological and genetic relationships among fissiparous and non-fissiparous populations of the seastar *Asterina burtoni* from the Red and Mediterranean Seas. Oral

- Patruno, M., M.D. Candia Carnevali, F. Bonasoro, P. Beesley, M.C. Thorndyke. Stress and regeneration in crinoids and asteroids. Oral
- Sköld, M., M.F. Barker, and P.V. Mladenov. The role of environmental factors in regulating asexual reproduction in the sea star *Coscinasterias muricata*: effects of food availability and fluctuating temperature. Oral
- Thorndyke, M.C. Regeneration in Echinoderms. Invited Speaker
- Alves, S.L.S., A.D. Pereira, and C.R.R. Ventura. Sexual and asexual reproduction in a population of *Coscinasterias tenuispina* (Lamarck 1816) from Rio de Janeiro, Brazil. Poster
- Carvalho, A.L.P.S., and C.R.R. Ventura. Reproductive cycle of *Asterina stellifera* (Möbius) (Asteroidea: Asterinidae) in the Cabo Frio upwelling region Brazil. Poster
- Ventura, C.R.R. Gametogenesis and growth of two *Astropecten* species from midshelf upwelling region, Cabo Frio, Brazil. Poster
- Young, C.M., S. George, T. Griffin, D. McCarthy, and S. Brooke. The food required for reproduction in bathyal Echinoids. Oral



☆ ECHINODERM SPECIALISTS 'KEYWORD' LIST ☆

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ADAMS, NIKKI	PHYSIOLOGICAL-ECOLOGY BIOCHEMISTRY REPRODUCTION DEVELOPMENT
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AHEARN, CYNTHIA	TAXONOMY HOLOTHUROIDEA
ALBI, YVONNE	ECHINOIDEA PALEOCENE
ALI, MOHAMED SAID	ECHINOIDEA TERTIARY MESOZOIC
ALLEN, JOHN	BIODIVERSITY FUNCTIONAL-MORPHOLOGY
ALLISON, WILLIAM	TAXONOMY ECOLOGY BIOGEOGRAPHY FORAGING ASTEROIDEA
AMEZIANE-COMINARDI, NADIA	CRINOIDEA
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ANDERSON, OWEN	ECHINOIDEA MARINE-ECOLOGY POPULATION-BIOLOGY TAXONOMY
ANDERSON, ROLAND	TAXONOMY AQUARIUM-HUSBANDRY NATURAL-HISTORY
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ARCHER, JEFFREY	LARVAL-BIOLOGY REPRODUCTIVE-BIOLOGY
ARISOLA, AMELIA	CULTURE MEDICINAL-VALUE BIOLOGY
ARONSON, RICHARD	OPHIUROIDEA
ASHA, PAYIKAT SAHADEVAN	HOLOTHUROIDEA REPRODUCTIVE-BIOLOGY NUTRITION GENETICS PHYSIOLOGY
AUSICH, WILLIAM	CRINOIDEA TAPHONOMY PHYLOGENY TAXONOMY
BALSER, ELIZABETH	EVOLUTION DEVELOPMENT MORPHOLOGY PHYSIOLOGY
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BEAVER, HAROLD	BLASTOIDS MORPHOLOGY SYSTEMATICS
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BIRENHEIDE, RUDIGER	CRINOIDEA PHYSIOLOGY BEHAVIOR MORPHOLOGY
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BLACK, W. ROBERT	ECHINOIDEA FUNCTIONAL-MORPHOLOGY ECOLOGY
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 CONAND, CHANTAL
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 GOUVEIA-MONTEIRO, A. M.
 GRABOWSKY-KAAIALI, GAIL
 GREENSTEIN, BENJAMIN
 GROSJEAN, PHILIPPE
 GROVES, CATHY
 GRYGIER, MARK
 GUDMUNDSSON, JON E.
 GUERRAZZI, MARIA
 GUILLOU, MONIQUE
 GURREA, ISIDRE
 GUTT, JULIAN
 HADEL, VALERIA FLORA
 HAGEN, NILS
 HAMEL, JEAN-FRANCOIS
 HAMZA HASSAN, M.
 HAUDE, REIMUND
 HAVARDSSON, BJORGOLFUR
 HEINZELLER, THOMAS
 HENDLER, GORDON
 HERDENDORF, CHARLES
 HESS, HANS
 HICKMAN, JR., CLEVELAND
 HIGHSMITH, RAYMOND
 HILL, ROBERT
 HOBERG, MAX
 HOFFMAN, JENNIFER
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 HOOD, SARAH
 HOOPER, ROBERT
 HOROWITZ, ALAN STANLEY
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 HOTCHKISS, FREDERICK
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 IRIMURA, SEIICHI
 ISHIDA, YOSHIKI
 IVY, W. GRISILDA
 JABLONSKI, DAVID
 JACOBSEN, NANCY
 JAECKLE, WILLIAM
 JAGT, JOHN
 JAMES, DANIEL
 JAMESON, GLEN
 JANIES, DANIEL
 JEFFERIES, RICHARD P.
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 JELL, PETER
 JELLET, JOAN E.
 JOHNSON, SONKE
 JUNIO-MENEZ, ANNETTE
 JUNQUEIRA, ANDREA
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 KASYANOV, VLADIMIR
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 LAWRENCE, JOHN
 LE MENN, JEAN
 LEMBO, LUIZ
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 MASSIN, CLAUDE
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Obituary Sven Otto Hörstadius (1898-1996)

Sven Hörstadius passed away in Sweden on 16 June 1996 at 98 years of age. Long a Professor at the University of Uppsala, he had been awarded an honorary doctorate at the Sorbonne in 1954.

His experimental work on what was called developmental mechanics, since the time of W. Roux, was famous. Echinoderm eggs and sea urchin embryos have long served as experimental models essential for our understanding of the mechanisms of fecundation and early development of metazoans. Following notably Boveri and Driesch, Sven Hörstadius carried out a remarkable series of experimental procedures showing the evolutionary possibilities of cell lines from isolated blastomeres, or from combinations of blastomeres of different regions of very young morulae. He showed, among other things, the inductive role of micromeres on the blastomeres destined to form the vegetative plaque and the archenteron.

Sven Hörstadius carried out his experimental work using the marvelously precise techniques of microdissection with needles and of in vivo staining; this enabled him to correct certain erroneous interpretations by Driesch.

He interpreted the results of his own experiments, in agreement with J. Runnström, in considering that two important gradients of opposing substances extended from one extremity to the other of the egg's primordial axis. These substances, respectively "animalizing" or "vegetalizing", would affect the differentiation of a "harmonious" larva by their relative quantities.

In his studies of development of the sea urchin egg, a "regulated" egg, Sven Hörstadius called attention to what would later be called negative inductive interactions. This work is still topical, as in the recent research of the Americans E. H. Davidson, R. A. Cameron, R. J. Hardin and others, all based on the quantity and quality of Hörstadius's experimental results. The "double-gradient" hypothesis is challenged by Davidson, who has studied the expression of molecular markers specific for embryonic tissue, the activity of transcription system of the genome during egg segmentation, and the determination or specificity of the parent or founder cells of cell lines. Davidson proposes a

new explanation of the development of the sea urchin: he suggests that the specification of the founder cells for the cell lines giving rise to the five polyclonal territories of the blastula must depend, among other elements, on the utilization of maternal factors localized according to the primordial axis of the embryo.

Writing these lines, I am reminded of the researchers who occupied what was known in Roscoff as the "Swedish table", everyone in the group from the Wenner Gren Institute of Experimental Biology in Stockholm, animated by J. Runnström and the teaching staff of the University of Uppsala, who came regularly to Roscoff between 1946 and 1956, and among these, Per Eric Lindhal accompanied by the young Bertil Swedmark.

It was during this period that Sven Hörstadius published his more physiological findings, those on animalizing and vegetalizing substances, with Trygve Gustafson, and those conducted with J. F. Danielli and I. J. Lorch on the effects of the enucleation of eggs.

At that time, Sven Hörstadius was a very well-known man, physically squared-off, almost stiff. Thanks to the counsel of Bertil Swedmark, I discovered, behind that classic façade of a "University Professor," a very subtle man, attentive and smiling, who even knew how to set off student applause by his transformation into a remarkable mime at a party given at the "Hotel de la Marine". What the embryologists and the regulars at marine research stations didn't usually know, was Hörstadius's real passion for photography and birds: he was one of the founders of the World and Wildlife Fund.

Fifty years have passed, and biology has undergone a complete mutation. Many biologists famous in their time are already almost forgotten. The name of Sven Hörstadius remains brilliant, so strongly has his work marked the biology of development.

Claude Levi
Muséum National d'Histoire Naturelle, Paris
Laboratoire de Biologie des Invertébrés Marin
et Malacologie.

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MARINE RESOURCES DIVISION
INFORMATION SECTION

BECHE-DE-MER

Number 9 – March 1997

INFORMATION BULLETIN



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NOTE FROM THE EDITOR

Welcome to the ninth *Beche-de-mer Information Bulletin*. This issue contains contributions from the various fields of sea cucumber biology and fishery, arranged as in the previous issues. The number of members is still increasing, and we hope that the new members will contribute to future issues.

Since the last issue, the highlight has been the symposium devoted to echinoderm fisheries and aquaculture during the International Echinoderm Conference, which was held in San Francisco in August 1996. The abstracts are presented here (see p. 26) and the papers will be published in 1997 by the editor A.A. Balkema (Rotterdam). The increase in overexploitation, now spreading to many coastal zones of the tropical East Pacific is one of the issues discussed.

An original approach is also being carried out in a traditional exploitation country—Madagascar—in the context of a regional programme (Commission de l'Océan Indien (COI), GICZ). To achieve sustainable exploitation of this fragile resource, the exporters have decided to organise the profession (see p. 4).

Several contributions update the state of the fisheries, as in Tuvalu (see p. 2), California and Washington State (see p. 11 and 12), Torres Strait reefs (see p. 17),

In the rubrique 'Asexual reproduction by fission' new observations are reported for the first time on the species *Holothuria leucospilota* (see p. 5) which had been previously cited as reproducing only sexually.

A new rubrique on aquaculture could also be prepared (see ICLARM results in the Solomon Islands, p. 3). We are looking forward to your suggestions and contributions.

Chantal Conand

Inside this issue

Beche-de-mer production in Tuvalu

by K. Belhadjali p. 2

A new study of asexual reproduction in holothurians: Fission in *Holothuria leucospilota* populations on Reunion Island in the Indian Ocean

by C. Conand et al. p. 5

A brief survey of the commercial sea cucumber *Isostichopus fuscus* Ludwig, 1875 of the Galapagos Islands, Ecuador

by J. Sonnenholzner p. 12

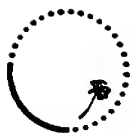
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Secretariat of the Pacific Community

BECHE-DE-MER

Number 10 — May 1998

INFORMATION BULLETIN



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Editorial

This 10th edition of the Bulletin gives us an opportunity to review the progress made in the 'sea-cucumber sector' information system in broad terms. After beginning in the tropical Pacific, the Bulletin has gradually acquired a wide international audience, while sea cucumber fisheries, often a source of conflict, have grown.

Readers, I would like to thank all those who have already contributed to the Bulletin, and ask that you take an active role in its improvement, as many of you have already indicated that the Bulletin is useful for you. I would be very interested in having your opinion on the following questions:

- Is the current presentation by section, i.e. 1) New Information, 2) Correspondence, 3) Publications, satisfactory?
- Which section should be given more space?
- In the 'New Information' section, parts on 'In situ spawning observations' and 'Asexual reproduction through fission observations' have been introduced. This issue will for the first time include a part on 'Aquacultural information', with help from S. Battaglene at ICLARM. Are there any other new parts that you would like to see included?

Your suggestions and comments are both useful and necessary.

This Bulletin includes original articles on the resources of several different countries, including Malaysia (p. 2); Madagascar (p. 7-13); Sulawesi, Indonesia (p. 31); and Mozambique (p. 34). Many different aspects of the biology of asexual reproduction through fission (p. 15) and identifying specimens are discussed. And a contribution on the aquaculture of the species *Stichopus japonicus* (p. 24) will certainly meet the expectations of those interested in this activity.

Chantal Conand

Inside this issue

The taxonomy and exploitation of sea cucumbers in Malaysia

by M. Baine & B. Forbes p. 2

Sustainable management of the sea cucumber fishery sector in Madagascar

by C. Conand et al. p. 7

Sea cucumber exploitation in the Toliara region of south-west Madagascar

by R. Rasolofanirina et al. p. 10

Laamu atoll mariculture project Low profile cage for retaining sea cucumbers

by N. Reichenbach et al. p. 14

Fission in a population of *Stichopus chloronotus* on Reunion Island, Indian Ocean

by C. Conand et al. p. 15

Technical development in seed production of the Japanese sea cucumber, *Stichopus japonicus*

by S. Ito & H. Kitamura p. 24

and much more ...

11



MARINE RESOURCES DIVISION - INFORMATION SECTION

Echinoderms: San Francisco

Edited by

RICH MOOI

California Academy of Sciences, San Francisco, California, USA

MALCOLM TELFORD

University of Toronto, Ontario, Canada

The texts of the various papers in this volume were set individually by typists under the supervision of each of the authors concerned.

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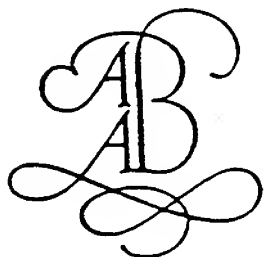
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ROYAL BRITISH COLUMBIA MUSEUM
H A N D B O O K

Sea Cucumbers

OF BRITISH COLUMBIA, SOUTHEAST ALASKA
AND PUGET SOUND

PHILIP LAMBERT



UBC PRESS / VANCOUVER

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FAUNA SINICA

Phylum Echinodermata

Class Holothuroidea

by

Liao Yulin

A Major Project of the National Natural
Science Foundation of China in the Period of the Eighth Five-Year Plan
(Supported by the State Science and Technology Commission
of China, the National Natural Science Foundation of China
and the Chinese Academy of Sciences)

Science Press

Beijing, China

1997

英文摘要

(Abstract)

This book is a volume of Fauna Sinica which deals with a class Holothurioidea of the Phylum Echinodermata occurring in Chinese waters. The number of species including is 134, belonging to 57 genera in 15 families of 6 orders.

The vast majority of the material on which the present study has been based is found in the collections made by the Institute of Oceanology, Academia Sinica during the past forty years along the whole coast of China, including the offshore Xisha Islands in the South China Sea. Some of the specimens came from shore collecting but most were taken by extensive benthic sampling, north from the Pohai Sea south to the Gulf of Tonkin and Hainan Island during Programme of Oceanographical Cruises of China carried out in 1958—1960.

The bathymetrical range covered is from the intertidal zone to about 200 meters, exceptionally more the approximate extent of the continental shelf.

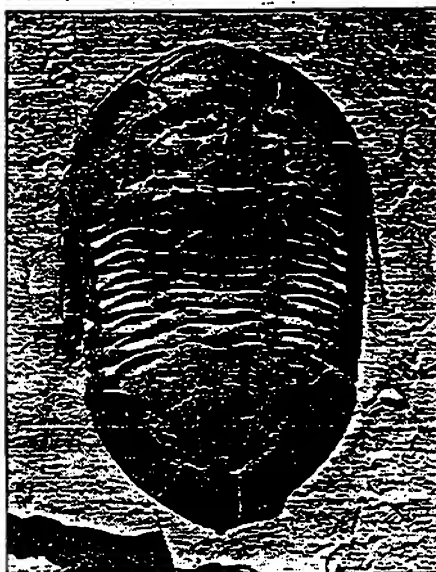
The text contains two parts: a comprehensive survey and a systematic descriptions. The former part provides the historical review, morphology, system of classification, geographical distribution, biology and economic significance of holothurians. The latter part covers the systematic account for Holothurioidea of China, diagnoses are given for the higher taxa above species, keys to aid identification and details of the ranges of the species, among other observations. All species are figured.

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The Ohio Department of Natural Resources, Division of Geological Survey

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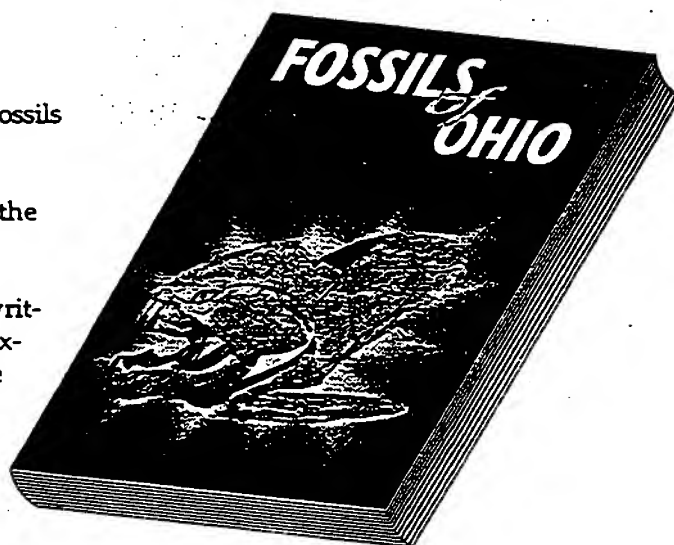
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Cynthia - for the Newsletter
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L.R.G. Cannon, H. Silver, K. Estep

North Australian Sea Cucumbers

This interactive CD-ROM describes and illustrates in full colour (drawings and micrographs) more than 90 species of sea cucumbers which occur throughout the Pacific and can be seen at the Great Barrier Reef. Besides synonyms and literature references, information is provided on the external characteristics, habitat, ecology, distribution, and taxonomy. Identification is supported by a pictorial interactive key, and the glossary comprises over 200 scientific terms.



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為使國人對神秘神奇的海洋世界有所認識，喚起愛護海洋資源的情懷，進而達到保育海洋生物的目的，特選用具有本土生態特性、形態特殊且色彩鮮麗之四種海洋生物，印製海洋生物郵票一組四枚，是項郵票係委請國立海洋生物博物館籌備處主任方力行教授及研究海洋生物之著名學者多人共同規劃，茲將本套郵票圖案簡介如下：

- (一)珊瑚類：圓管珊瑚廣泛分布於臺灣沿岸的珊瑚礁海域，在水深五公尺以下的礁石上到處可見，為珊瑚礁生物的典型代表。
- (二)深翅類：伊科莎白多影海牛在臺灣南部恆春半島的亞洲帶珊瑚礁海域終年可見，常成群出現在珊瑚礁上，主要分布在水深十到二十公尺之間。
- (三)管蟲類：大旋起蟲廣泛分布於臺灣四週珊瑚礁海域，為雌雄異體，常棲息於活的微孔珊瑚斜體上，蟲體前端有左右兩枚羽狀起冠，呈螺旋漏斗狀，具呼吸和攝食功能。
- (四)棘皮類：巨翅羽枝俗名海草蟲，在墾丁水深十五公尺左右的珊瑚礁海域極為常見，喜行棲息於水流較強的珊瑚礁及岩石表面，其觸手海綿的中央出水口邊緣。

To arouse citizens' love for oceanic resources and thus to achieve the aim of protecting oceanic creatures, this Directorate issued a set of four postage stamps on Sept. 7, 1995, depicting *Tubastraea aurea* Quoy & Gaimard, *Chromodoris elizabethina* Bergh, *Spirobranchus giganteus corniculatus* Grube, and *Himerometra magnipinna* Clark. These four stamps were designed by Professor Lee-shing Fang, Director of the National Museum of Marine Biology / Aquarium.

Taiwan is surrounded by seas. These seas abound with oceanic resources and nourish many colorful corals and marine animals. One NT\$3.50 stamp features *Tubastraea aurea* Quoy & Gaimard. These small marine animals are widely distributed along the coast of Taiwan, growing in rocks below waters 5 meters deep, and the other NT\$3.50 stamp depicts *Chromodoris elizabethina* Bergh. These elizabethina species are active in Hengchung Peninsula, growing in waters 10 to 20 meters deep. They often appear in pairs on coral reefs and mate between February and June. The NT\$5.00 stamp features *Spirobranchus giganteus corniculatus* Grube. These marine animals are found along the coast of Taiwan, and they have two gills, one for breathing and the other one for feeding. The NT\$17.00 stamp depicts *Himerometra magnipinna* Clark. These marine animals are found in Kenting areas, and like to live on the surface of rocks or the coral reefs in the waters 15 meters deep.

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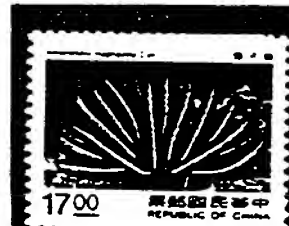
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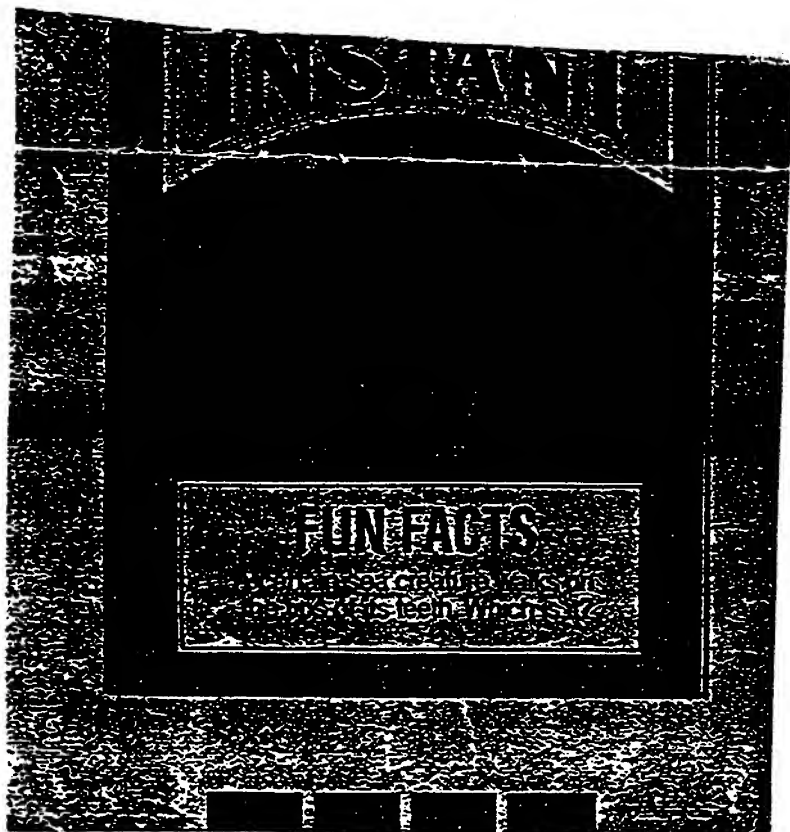
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The Tampa Tribune, Tuesday, September 2, 1997

Urchins chomping Keys grass

An Associated Press report

MARATHON — An army of sea urchins is destroying the sea grass off this island in the Florida Keys, having chomped three square mile area of sea bottom about eight miles off shore.

Marching like the foreign legion in a column a yard wide and two miles long, the urchins have left little in their trail.

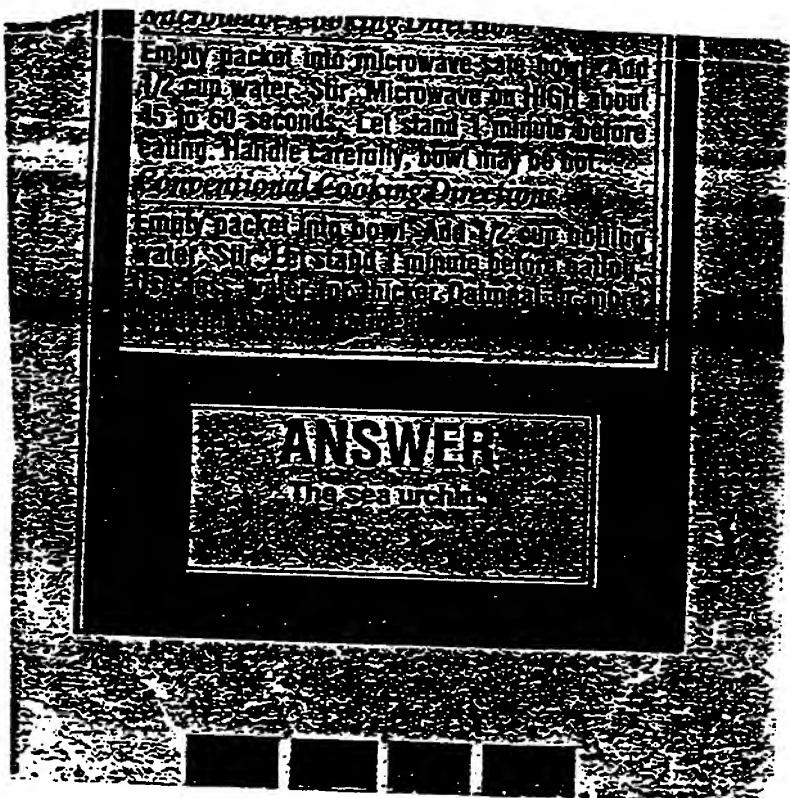
"It kind of looks like a two-day-old growth of a man's beard — that stubble," said John Hunt, a research administrator with the Florida Department of Environmental Protection.

"There are little tiny stems sticking out of the mud."

Hunt said he doesn't yet have an explanation for what they think is a local population explosion. Urchins don't usually congregate like this, he said.

A similar eating frenzy occurred off the Florida Panhandle in 1971, but the urchins died before scientists could determine why they had gathered together for a meal. Urchins look like red or purple pin cushions.

They get around on tube feet propelled by the water pressure they generate inside their bodies.



Empty packet into microwave safe bowl. Add 1/2 cup water. Stir. Microwave on HIGH about 45 to 60 seconds. Let stand 1 minute before eating. Handle carefully, bowl may be hot.

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ANSWER

The sea urchin

Maria Elena Caso

Y SUS ESTRELLITAS QUE RESPIRAN, VIVEN Y JUEGAN



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¡PERO SI VIVES EN EL AGUA!

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¡YA NOS EMPEZARON
A COCINAR!

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YO ME LLAMO
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ASI QUE, AÑOS MAS TARDE,
SE TITULO Y DOCTORO CON
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A TI TE TOCA AQUÍ,
CON TU FAMILIA

¡NO, YO VIVO
CON MI
MAMA!

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